Final_Practicum_2

Meghana_Nadig

March 20, 2018

Problem 1

Question 1

```
data_1 <- read.csv("C:/Users/Meghana Nadig/Downloads/adult.data.txt", col.names = c("age","workclass","


t <- data_1

t[t == " ?"] <- NA
```

Problem 1

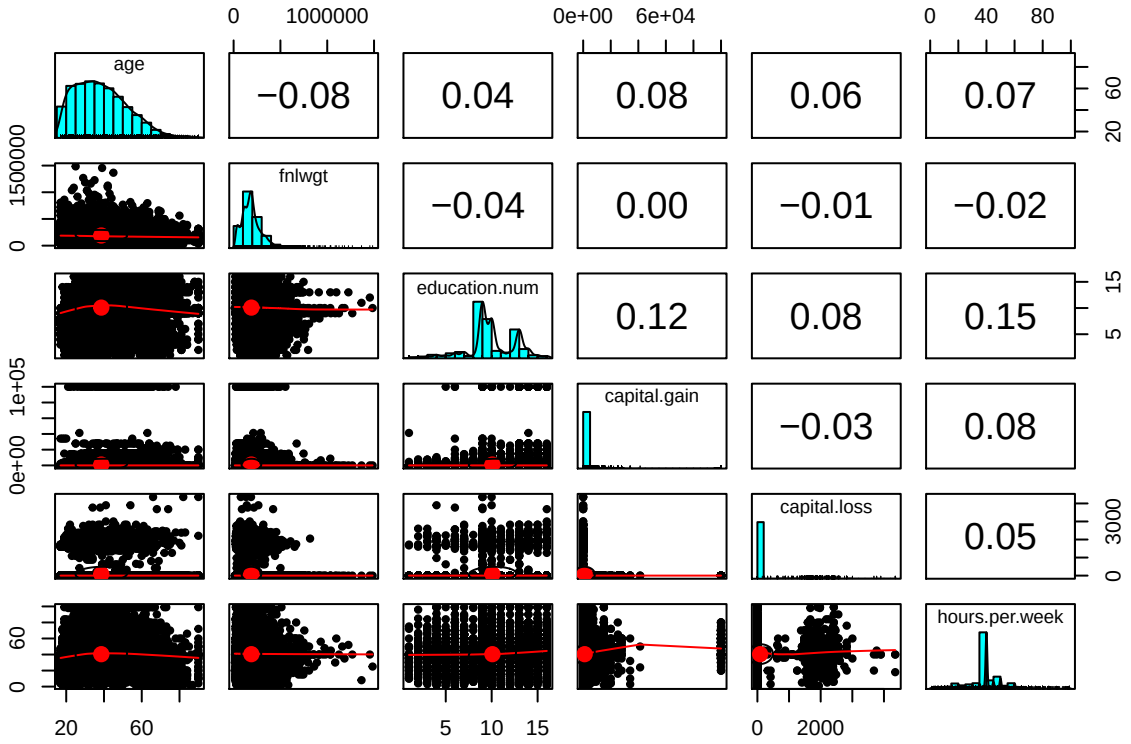
Question 2

```
getmode <- function(v) {
   uniqv <- unique(v)
   uniqv[which.max(tabulate(match(v, uniqv)))]
}

wc <- getmode(t$workclass)
oc <- getmode(t$occupation)
nc <- getmode(t$native.country)


t$workclass[which(is.na(t$workclass))] <- wc
t$occupation[which(is.na(t$occupation))] <- oc
t$native.country[which(is.na(t$native.country))] <- nc

library(psych)
```

```
##
## Attaching package: 'psych'
```

```
## The following objects are masked from 'package:ggplot2':
##
##     %+%, alpha
```

```
pairs.panels(t[c(1,3, 5, 11,12,13)])
```



Problem 1

Question 3

```
library(plyr)

yal <- t

f1 <- table(yal$workclass, yal$class)
f2 <- table(yal$education, yal$class)
f3 <- table(yal$marital.status, yal$class)
f4 <- table(yal$occupation, yal$class)
f5 <- table(yal$relationship, yal$class)
f6 <- table(yal$race, yal$class)
f7 <- table(yal$sex, yal$class)
f8 <- table(yal$native.country, yal$class)

freq <- function(x)
{
  k <- numeric(nrow(x))
  l <- numeric(nrow(x))
  cold(x, k, l)
}
```

```
cold <- function(x, k, l)
{
  pop <- x
  pop_no <- nrow(x)
  for (i in 1:pop_no)
  {
    k[i] <- x[i,2]/sum(x[i,1],x[i,2])
    l[i] <- x[i,1]/sum(x[i,1],x[i,2])
  }
  pop <- cbind(pop, k, l)
  colnames(pop)[3] <- c(">50K")
  colnames(pop)[4] <- c("<50K")
  print(pop)
}

unclassing1 <- unclass(f1)
unclassing2 <- unclass(f2)
unclassing3 <- unclass(f3)
unclassing4 <- unclass(f4)
unclassing5 <- unclass(f5)
unclassing6 <- unclass(f6)
unclassing7 <- unclass(f7)
unclassing8 <- unclass(f8)

Race1 <- freq(unclassing6)
```

```
##                       <=50K  >50K       >50K      <50K
##  Amer-Indian-Eskimo    275    36 0.11575563 0.8842444
##  Asian-Pac-Islander    763   276 0.26564004 0.7343600
##  Black                2737   387 0.12387964 0.8761204
##  Other                 246    25 0.09225092 0.9077491
##  White               20698  7117 0.25586914 0.7441309
```

```
Sex1 <- freq(unclassing7)
```

```
##          <=50K  >50K      >50K      <50K
##  Female   9592  1179 0.1094606 0.8905394
##  Male    15127  6662 0.3057506 0.6942494
```

```
Workclass1 <- freq(unclassing1)
```

```
##                    <=50K  >50K      >50K      <50K
##  Federal-gov         589   371 0.3864583 0.6135417
##  Local-gov          1476   617 0.2947922 0.7052078
##  Never-worked          7     0 0.0000000 1.0000000
##  Private           19378  5154 0.2100929 0.7899071
##  Self-emp-inc        494   622 0.5573477 0.4426523
##  Self-emp-not-inc   1817   724 0.2849272 0.7150728
##  State-gov           944   353 0.2721665 0.7278335
##  Without-pay          14     0 0.0000000 1.0000000
```

```
Education1 <- freq(unclassing2)
```

```
##                <=50K  >50K       >50K      <50K
##  10th            871    62 0.06645230 0.9335477
```

```
##  11th           1115    60 0.05106383 0.9489362
##  12th            400    33 0.07621247 0.9237875
##  1st-4th         162     6 0.03571429 0.9642857
##  5th-6th         317    16 0.04804805 0.9519520
##  7th-8th         606    40 0.06191950 0.9380805
##  9th             487    27 0.05252918 0.9474708
##  Assoc-acdm      802   265 0.24835989 0.7516401
##  Assoc-voc      1021   361 0.26121563 0.7387844
##  Bachelors      3133  2221 0.41483003 0.5851700
##  Doctorate       107   306 0.74092010 0.2590799
##  HS-grad        8826  1675 0.15950862 0.8404914
##  Masters         764   959 0.55658735 0.4434127
##  Preschool        51     0 0.00000000 1.0000000
##  Prof-school     153   423 0.73437500 0.2656250
##  Some-college   5904  1387 0.19023454 0.8097655
```

```
NativeCountry1 <- freq(unclassing8)
```

```
##                               <=50K  >50K       >50K      <50K
##  Cambodia                        12     7 0.36842105 0.6315789
##  Canada                          82    39 0.32231405 0.6776860
##  China                           55    20 0.26666667 0.7333333
##  Columbia                        57     2 0.03389831 0.9661017
##  Cuba                            70    25 0.26315789 0.7368421
##  Dominican-Republic              68     2 0.02857143 0.9714286
##  Ecuador                         24     4 0.14285714 0.8571429
##  El-Salvador                     97     9 0.08490566 0.9150943
##  England                         60    30 0.33333333 0.6666667
##  France                          17    12 0.41379310 0.5862069
##  Germany                         93    44 0.32116788 0.6788321
##  Greece                          21     8 0.27586207 0.7241379
##  Guatemala                       61     3 0.04687500 0.9531250
##  Haiti                           40     4 0.09090909 0.9090909
##  Holand-Netherlands               1     0 0.00000000 1.0000000
##  Honduras                        12     1 0.07692308 0.9230769
##  Hong                            14     6 0.30000000 0.7000000
##  Hungary                         10     3 0.23076923 0.7692308
##  India                           60    40 0.40000000 0.6000000
##  Iran                            25    18 0.41860465 0.5813953
##  Ireland                         19     5 0.20833333 0.7916667
##  Italy                           48    25 0.34246575 0.6575342
##  Jamaica                         71    10 0.12345679 0.8765432
##  Japan                           38    24 0.38709677 0.6129032
##  Laos                            16     2 0.11111111 0.8888889
##  Mexico                         610    33 0.05132193 0.9486781
##  Nicaragua                       32     2 0.05882353 0.9411765
##  Outlying-US(Guam-USVI-etc)      14     0 0.00000000 1.0000000
##  Peru                            29     2 0.06451613 0.9354839
##  Philippines                    137    61 0.30808081 0.6919192
##  Poland                          48    12 0.20000000 0.8000000
##  Portugal                        33     4 0.10810811 0.8918919
##  Puerto-Rico                    102    12 0.10526316 0.8947368
##  Scotland                         9     3 0.25000000 0.7500000
##  South                           64    16 0.20000000 0.8000000
##  Taiwan                          31    20 0.39215686 0.6078431
```

```
##  Thailand                       15     3 0.16666667 0.8333333
##  Trinadad&Tobago                17     2 0.10526316 0.8947368
##  United-States               22435  7317 0.24593305 0.7540670
##  Vietnam                        62     5 0.07462687 0.9253731
##  Yugoslavia                     10     6 0.37500000 0.6250000
```

```
Race1
```

```
##                      <=50K  >50K       >50K      <50K
##  Amer-Indian-Eskimo    275    36 0.11575563 0.8842444
##  Asian-Pac-Islander    763   276 0.26564004 0.7343600
##  Black                2737   387 0.12387964 0.8761204
##  Other                 246    25 0.09225092 0.9077491
##  White               20698  7117 0.25586914 0.7441309
```

```
Sex1
```

```
##          <=50K  >50K      >50K      <50K
##  Female   9592  1179 0.1094606 0.8905394
##  Male    15127  6662 0.3057506 0.6942494
```

```
Workclass1
```

```
##                    <=50K  >50K      >50K      <50K
##  Federal-gov         589   371 0.3864583 0.6135417
##  Local-gov          1476   617 0.2947922 0.7052078
##  Never-worked          7     0 0.0000000 1.0000000
##  Private           19378  5154 0.2100929 0.7899071
##  Self-emp-inc        494   622 0.5573477 0.4426523
##  Self-emp-not-inc   1817   724 0.2849272 0.7150728
##  State-gov           944   353 0.2721665 0.7278335
##  Without-pay          14     0 0.0000000 1.0000000
```

```
Education1
```

```
##                <=50K  >50K       >50K      <50K
##  10th            871    62 0.06645230 0.9335477
##  11th           1115    60 0.05106383 0.9489362
##  12th            400    33 0.07621247 0.9237875
##  1st-4th         162     6 0.03571429 0.9642857
##  5th-6th         317    16 0.04804805 0.9519520
##  7th-8th         606    40 0.06191950 0.9380805
##  9th             487    27 0.05252918 0.9474708
##  Assoc-acdm      802   265 0.24835989 0.7516401
##  Assoc-voc      1021   361 0.26121563 0.7387844
##  Bachelors      3133  2221 0.41483003 0.5851700
##  Doctorate       107   306 0.74092010 0.2590799
##  HS-grad        8826  1675 0.15950862 0.8404914
##  Masters         764   959 0.55658735 0.4434127
##  Preschool        51     0 0.00000000 1.0000000
##  Prof-school     153   423 0.73437500 0.2656250
##  Some-college   5904  1387 0.19023454 0.8097655
```

```
NativeCountry1
```

```
##                             <=50K  >50K       >50K      <50K
##  Cambodia                      12     7 0.36842105 0.6315789
##  Canada                        82    39 0.32231405 0.6776860
##  China                         55    20 0.26666667 0.7333333
```

```
##  Columbia                       57     2 0.03389831 0.9661017
##  Cuba                           70    25 0.26315789 0.7368421
##  Dominican-Republic             68     2 0.02857143 0.9714286
##  Ecuador                        24     4 0.14285714 0.8571429
##  El-Salvador                    97     9 0.08490566 0.9150943
##  England                        60    30 0.33333333 0.6666667
##  France                         17    12 0.41379310 0.5862069
##  Germany                        93    44 0.32116788 0.6788321
##  Greece                         21     8 0.27586207 0.7241379
##  Guatemala                      61     3 0.04687500 0.9531250
##  Haiti                          40     4 0.09090909 0.9090909
##  Holand-Netherlands              1     0 0.00000000 1.0000000
##  Honduras                       12     1 0.07692308 0.9230769
##  Hong                           14     6 0.30000000 0.7000000
##  Hungary                        10     3 0.23076923 0.7692308
##  India                          60    40 0.40000000 0.6000000
##  Iran                           25    18 0.41860465 0.5813953
##  Ireland                        19     5 0.20833333 0.7916667
##  Italy                          48    25 0.34246575 0.6575342
##  Jamaica                        71    10 0.12345679 0.8765432
##  Japan                          38    24 0.38709677 0.6129032
##  Laos                           16     2 0.11111111 0.8888889
##  Mexico                        610    33 0.05132193 0.9486781
##  Nicaragua                      32     2 0.05882353 0.9411765
##  Outlying-US(Guam-USVI-etc)     14     0 0.00000000 1.0000000
##  Peru                           29     2 0.06451613 0.9354839
##  Philippines                   137    61 0.30808081 0.6919192
##  Poland                         48    12 0.20000000 0.8000000
##  Portugal                       33     4 0.10810811 0.8918919
##  Puerto-Rico                   102    12 0.10526316 0.8947368
##  Scotland                        9     3 0.25000000 0.7500000
##  South                          64    16 0.20000000 0.8000000
##  Taiwan                         31    20 0.39215686 0.6078431
##  Thailand                       15     3 0.16666667 0.8333333
##  Trinadad&Tobago                17     2 0.10526316 0.8947368
##  United-States               22435  7317 0.24593305 0.7540670
##  Vietnam                        62     5 0.07462687 0.9253731
##  Yugoslavia                     10     6 0.37500000 0.6250000
```

```
freq(unclassing3)
```

```
##                         <=50K  >50K       >50K      <50K
##  Divorced                3980   463 0.10420887 0.8957911
##  Married-AF-spouse         13    10 0.43478261 0.5652174
##  Married-civ-spouse      8284  6692 0.44684829 0.5531517
##  Married-spouse-absent    384    34 0.08133971 0.9186603
##  Never-married          10191   491 0.04596518 0.9540348
##  Separated                959    66 0.06439024 0.9356098
##  Widowed                  908    85 0.08559919 0.9144008
```

```
freq(unclassing4)
```

```
##                      <=50K  >50K        >50K      <50K
##  Adm-clerical         3262   507 0.134518440 0.8654816
##  Armed-Forces            8     1 0.111111111 0.8888889
```

```
##  Craft-repair        3170   929 0.226640644 0.7733594
##  Exec-managerial     2098  1968 0.484013773 0.5159862
##  Farming-fishing      879   115 0.115694165 0.8843058
##  Handlers-cleaners   1284    86 0.062773723 0.9372263
##  Machine-op-inspct   1752   250 0.124875125 0.8751249
##  Other-service       3158   137 0.041578149 0.9584219
##  Priv-house-serv      148     1 0.006711409 0.9932886
##  Prof-specialty      3933  2050 0.342637473 0.6573625
##  Protective-serv      438   211 0.325115562 0.6748844
##  Sales               2667   983 0.269315068 0.7306849
##  Tech-support         645   283 0.304956897 0.6950431
##  Transport-moving    1277   320 0.200375704 0.7996243
```

```
freq(unclassing5)
```

```
##                  <=50K  >50K       >50K      <50K
##  Husband          7275  5918 0.44857121 0.5514288
##  Not-in-family    7448   856 0.10308285 0.8969171
##  Other-relative    944    37 0.03771662 0.9622834
##  Own-child        5001    67 0.01322021 0.9867798
##  Unmarried        3228   218 0.06326175 0.9367382
##  Wife              823   745 0.47512755 0.5248724
```

Problem 1

Question 4

```
table <- count(t, 'class')

class_probability_more <- table[1,2]/sum(table[1,2], table[2,2])
class_probability_less <- table[2,2]/sum(table[1,2], table[2,2])
class_probability_more
```

```
## [1] 0.759183
```

```
class_probability_less
```

```
## [1] 0.240817
```

```
W_1 <- as.numeric( Race1[5,3])
M_1 <- as.numeric(Sex1[2,3])
F_1 <- as.numeric(Workclass1[1,3])
E_1 <- as.numeric(Education1[10,3])
N_1 <- as.numeric(NativeCountry1[21,3])


W_2 <- as.numeric(Race1[5,4])
M_2 <- as.numeric(Sex1[2,4])
F_2 <- as.numeric(Workclass1[1,4])
E_2 <- as.numeric(Education1[10,4])
N_2 <- as.numeric(NativeCountry1[21,4])

K_50 <- class_probability_more*W_1*M_1*F_1*E_1*N_1
```

```
L_50 <- class_probability_less*W_2*M_2*F_2*E_2*N_2

M_50 <- K_50/sum(K_50, L_50)
P_50 <- L_50/sum(K_50, L_50)
```

Problem 1

Question 5

```
popp <- function(namess)
{
  kk <- numeric(nrow(namess))
  ll <- numeric(nrow(namess))
  cold2(namess, kk, ll)
}

cold2 <- function(namess, kk, ll)
{
  fog <- namess
  v <- nrow(namess)
  for (i in 1:v)
  {
    kk[i] <- namess[i,2]/sum(namess[i,1],namess[i,2])
    ll[i] <- namess[i,1]/sum(namess[i,1],namess[i,2])
  }
  fog <- cbind(fog, kk, ll)
  colnames(fog)[3] <- c(">50K")
  colnames(fog)[4] <- c("<50K")
}

func1 <- function(y)
{
  gh <- unclass(table(y$workclass, y$class))
  da <- popp(gh)
}

func2 <- function(q)
{
  ddw <- unclass(table(q$education, q$class))
  fef <- popp(ddw)
}

func3 <- function(q)
{
  ddw1 <- unclass(table(q$race, q$class))
  fef1 <- popp(ddw1)
}

func4 <- function(q)
{
```

```
  ddw2 <- unclass(table(q$sex, q$class))
  fef2 <- popp(ddw2)
}

func5 <- function(q)
{
  ddw3 <- unclass(table(q$native.country, q$class))
  fef3 <- popp(ddw3)
}

func6 <- function(g)
{

  A <- func1(g)
  B <- func2(g)
  C <- func3(g)
  D <- func4(g)
  E <- func5(g)

  P50 <- count(g, 'class')
  P60 <- P50[1,2]/sum(P50[1,2], P50[2,2])
  P70 <- P50[2,2]/sum(P50[1,2], P50[2,2])

  White_1 <- as.numeric(A1[5,3])
  Male_1 <- as.numeric(B1[2,3])
  Fed_1 <- as.numeric(C1[1,3])
  Edu_1 <- as.numeric(D1[10,3])
  Native_1 <- as.numeric(E1[21,3])


  White_2 <- as.numeric(A1[5,4])
  Male_2 <- as.numeric(B1[2,4])
  Fed_2 <- as.numeric(C1[1,4])
  Edu_2 <- as.numeric(D1[10,4])
  Native_2 <- as.numeric(E1[21,4])

  KM <- P60*White_1*Male_1*Fed_1*Edu_1*Native_1
  KL <- P70*White_2*Male_2*Fed_2*Edu_2*Native_2

  P60 <- KM/sum(KM, KL)
  print("> 50K")
  print(P60)

  Prob50L <- KL/sum(KM, KL)
  print("< 50K")
  print(Prob50L)
}
```

Problem 2

Question 1

```
#install.packages("xlsx")
library(xlsx)
```

```
## Loading required package: rJava
```

```
## Loading required package: xlsxjars
```

```
# Reading the data
uffidata <- read.xlsx("C:/Users/Meghana Nadig/Downloads/uffidata.xlsx",1)

#Omiting na values
uffidata1 <- na.omit(uffidata)

#After using the Step function we determing that the most influencing predictors are Year.Sold, Lot.Are
step(lm(uffidata1$Sale.Price ~ uffidata1$Year.Sold + uffidata1$Lot.Area + uffidata1$Living.Area_SF + uf
```

```
## Start:  AIC=1973.69
## uffidata1$Sale.Price ~ uffidata1$Year.Sold + uffidata1$Lot.Area +
##     uffidata1$Living.Area_SF + uffidata1$Pool + uffidata1$Brick.Ext +
##     uffidata1$X45.Yrs. + uffidata1$UFFI.IN + uffidata1$Bsmnt.Fin_SF +
##     uffidata1$Enc.Pk.Spaces + uffidata1$Central.Air
##
##                             Df  Sum of Sq        RSS    AIC
## - uffidata1$X45.Yrs.         1 1.3401e+07 3.6100e+10 1971.7
## - uffidata1$Bsmnt.Fin_SF     1 2.2952e+08 3.6316e+10 1972.3
## - uffidata1$Central.Air      1 3.8987e+08 3.6476e+10 1972.8
## - uffidata1$UFFI.IN          1 4.7770e+08 3.6564e+10 1973.0
## <none>                                    3.6086e+10 1973.7
## - uffidata1$Lot.Area         1 1.1926e+09 3.7279e+10 1974.9
## - uffidata1$Brick.Ext        1 1.4579e+09 3.7544e+10 1975.6
## - uffidata1$Enc.Pk.Spaces    1 3.3919e+09 3.9478e+10 1980.6
## - uffidata1$Year.Sold        1 7.8992e+09 4.3986e+10 1991.3
## - uffidata1$Pool             1 1.0444e+10 4.6531e+10 1996.9
## - uffidata1$Living.Area_SF   1 2.1064e+10 5.7151e+10 2017.2
##
## Step:  AIC=1971.73
## uffidata1$Sale.Price ~ uffidata1$Year.Sold + uffidata1$Lot.Area +
##     uffidata1$Living.Area_SF + uffidata1$Pool + uffidata1$Brick.Ext +
##     uffidata1$UFFI.IN + uffidata1$Bsmnt.Fin_SF + uffidata1$Enc.Pk.Spaces +
##     uffidata1$Central.Air
##
##                             Df  Sum of Sq        RSS    AIC
## - uffidata1$Bsmnt.Fin_SF     1 3.3784e+08 3.6438e+10 1970.7
## - uffidata1$Central.Air      1 3.8187e+08 3.6482e+10 1970.8
## - uffidata1$UFFI.IN          1 4.9803e+08 3.6598e+10 1971.1
## <none>                                    3.6100e+10 1971.7
## - uffidata1$Lot.Area         1 1.4341e+09 3.7534e+10 1973.6
## - uffidata1$Brick.Ext        1 1.7167e+09 3.7817e+10 1974.3
## - uffidata1$Enc.Pk.Spaces    1 3.3842e+09 3.9484e+10 1978.6
## - uffidata1$Year.Sold        1 7.8922e+09 4.3992e+10 1989.3
```

```
## - uffidata1$Pool            1 1.1124e+10 4.7224e+10 1996.3
## - uffidata1$Living.Area_SF  1 2.1432e+10 5.7532e+10 2015.9
##
## Step:  AIC=1970.65
## uffidata1$Sale.Price ~ uffidata1$Year.Sold + uffidata1$Lot.Area +
##     uffidata1$Living.Area_SF + uffidata1$Pool + uffidata1$Brick.Ext +
##     uffidata1$UFFI.IN + uffidata1$Enc.Pk.Spaces + uffidata1$Central.Air
##
##                             Df  Sum of Sq        RSS    AIC
## - uffidata1$UFFI.IN          1 5.4468e+08 3.6982e+10 1970.1
## - uffidata1$Central.Air      1 6.5184e+08 3.7089e+10 1970.4
## <none>                                    3.6438e+10 1970.7
## - uffidata1$Brick.Ext        1 1.5958e+09 3.8033e+10 1972.9
## - uffidata1$Lot.Area         1 1.7944e+09 3.8232e+10 1973.4
## - uffidata1$Enc.Pk.Spaces    1 3.2573e+09 3.9695e+10 1977.1
## - uffidata1$Year.Sold        1 8.3994e+09 4.4837e+10 1989.2
## - uffidata1$Pool             1 1.1824e+10 4.8262e+10 1996.5
## - uffidata1$Living.Area_SF   1 2.1242e+10 5.7679e+10 2014.1
##
## Step:  AIC=1970.12
## uffidata1$Sale.Price ~ uffidata1$Year.Sold + uffidata1$Lot.Area +
##     uffidata1$Living.Area_SF + uffidata1$Pool + uffidata1$Brick.Ext +
##     uffidata1$Enc.Pk.Spaces + uffidata1$Central.Air
##
##                             Df  Sum of Sq        RSS    AIC
## - uffidata1$Central.Air      1 7.5048e+08 3.7733e+10 1970.1
## <none>                                    3.6982e+10 1970.1
## - uffidata1$Lot.Area         1 1.4365e+09 3.8419e+10 1971.9
## - uffidata1$Brick.Ext        1 1.5422e+09 3.8525e+10 1972.2
## - uffidata1$Enc.Pk.Spaces    1 3.6937e+09 4.0676e+10 1977.5
## - uffidata1$Year.Sold        1 1.0432e+10 4.7414e+10 1992.7
## - uffidata1$Pool             1 1.2401e+10 4.9384e+10 1996.8
## - uffidata1$Living.Area_SF   1 2.0745e+10 5.7728e+10 2012.2
##
## Step:  AIC=1970.11
## uffidata1$Sale.Price ~ uffidata1$Year.Sold + uffidata1$Lot.Area +
##     uffidata1$Living.Area_SF + uffidata1$Pool + uffidata1$Brick.Ext +
##     uffidata1$Enc.Pk.Spaces
##
##                             Df  Sum of Sq        RSS    AIC
## <none>                                    3.7733e+10 1970.1
## - uffidata1$Brick.Ext        1 1.6012e+09 3.9334e+10 1972.2
## - uffidata1$Lot.Area         1 2.1297e+09 3.9862e+10 1973.5
## - uffidata1$Enc.Pk.Spaces    1 3.8216e+09 4.1554e+10 1977.7
## - uffidata1$Year.Sold        1 1.0142e+10 4.7875e+10 1991.7
## - uffidata1$Pool             1 1.2400e+10 5.0133e+10 1996.2
## - uffidata1$Living.Area_SF   1 2.1197e+10 5.8930e+10 2012.2
##
## Call:
## lm(formula = uffidata1$Sale.Price ~ uffidata1$Year.Sold + uffidata1$Lot.Area +
##     uffidata1$Living.Area_SF + uffidata1$Pool + uffidata1$Brick.Ext +
##     uffidata1$Enc.Pk.Spaces, data = uffidata1)
##
```

```
## Coefficients:
##              (Intercept)       uffidata1$Year.Sold
##               -9.994e+06                 4.992e+03
##       uffidata1$Lot.Area  uffidata1$Living.Area_SF
##                2.530e+00                 5.220e+01
##           uffidata1$Pool       uffidata1$Brick.Ext
##                6.680e+04                 8.532e+03
##  uffidata1$Enc.Pk.Spaces
##                1.004e+04
```

```
# Using model summary and correlation to determine most influencing predictors

mode <- lm(Sale.Price ~ Year.Sold + Lot.Area + Living.Area_SF + Pool + Brick.Ext + X45.Yrs. + UFFI.IN +
summary(mode)
```

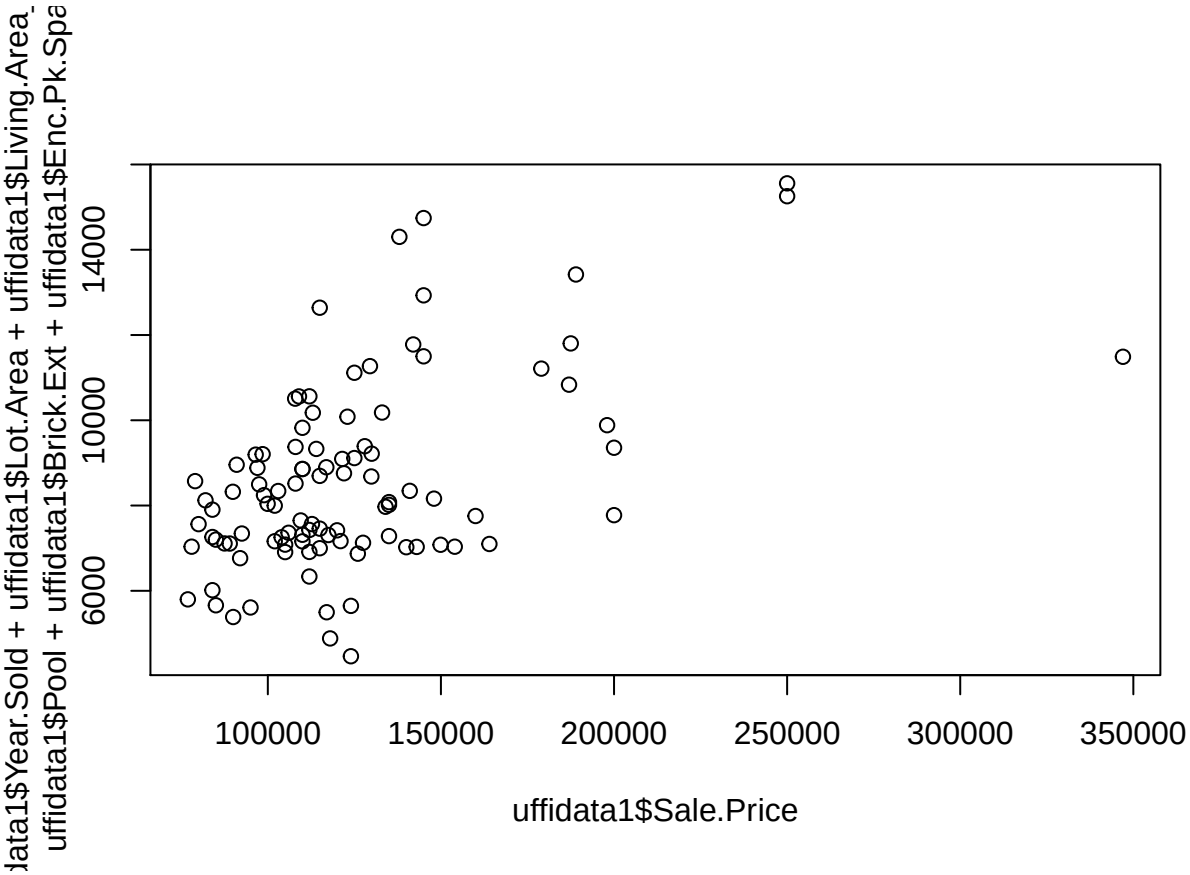
```
##
## Call:
## lm(formula = Sale.Price ~ Year.Sold + Lot.Area + Living.Area_SF +
##     Pool + Brick.Ext + X45.Yrs. + UFFI.IN + Bsmnt.Fin_SF + Enc.Pk.Spaces +
##     Central.Air, data = uffidata1)
##
## Residuals:
##    Min     1Q Median     3Q    Max
## -59286 -10455   -823   8842  94150
##
## Coefficients:
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -9.259e+06  2.118e+06  -4.372 3.37e-05 ***
## Year.Sold       4.626e+03  1.054e+03   4.389 3.15e-05 ***
## Lot.Area        2.175e+00  1.275e+00   1.705  0.09166 .
## Living.Area_SF  5.428e+01  7.573e+00   7.167 2.25e-10 ***
## Pool            6.358e+04  1.260e+04   5.047 2.40e-06 ***
## Brick.Ext       8.617e+03  4.570e+03   1.886  0.06266 .
## X45.Yrs.       -1.222e+03  6.759e+03  -0.181  0.85696
## UFFI.IN        -5.653e+03  5.238e+03  -1.079  0.28340
## Bsmnt.Fin_SF    7.797e+00  1.042e+01   0.748  0.45637
## Enc.Pk.Spaces   9.575e+03  3.329e+03   2.876  0.00505 **
## Central.Air     4.398e+03  4.511e+03   0.975  0.33221
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 20250 on 88 degrees of freedom
## Multiple R-squared:  0.7737, Adjusted R-squared:  0.748
## F-statistic: 30.09 on 10 and 88 DF,  p-value: < 2.2e-16
```

```
library(psych)
cor(uffidata1[c("Sale.Price","Year.Sold","Lot.Area","Living.Area_SF","Pool","Brick.Ext","X45.Yrs.","UFFI
```

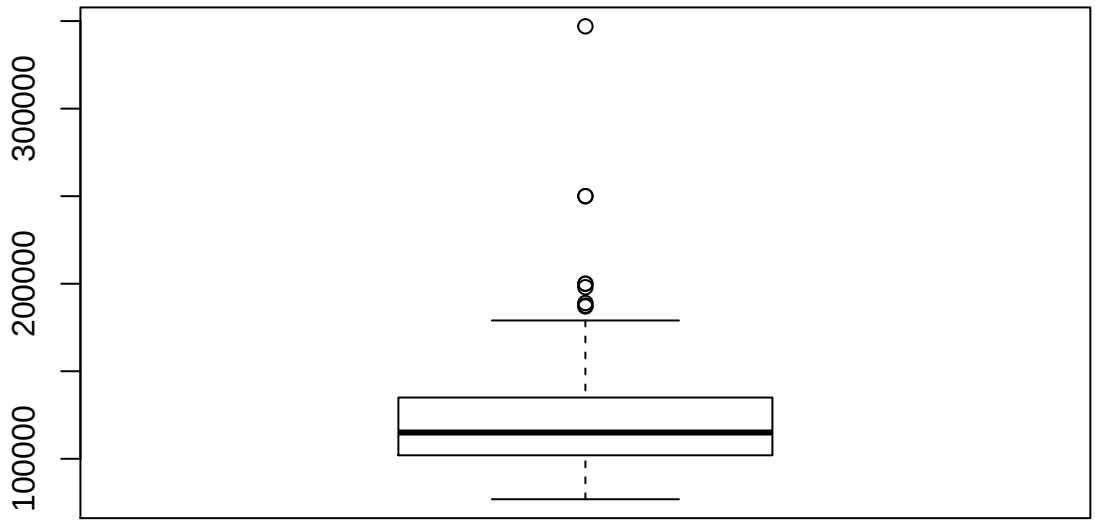
```
##                Sale.Price   Year.Sold     Lot.Area Living.Area_SF
## Sale.Price      1.0000000  0.56900042  0.449859639    0.723143670
## Year.Sold       0.5690004  1.00000000  0.270242640    0.350935605
## Lot.Area        0.4498596  0.27024264  1.000000000    0.394894002
## Living.Area_SF  0.7231437  0.35093560  0.394894002    1.000000000
## Pool            0.4333188  0.11727196  0.089901025    0.188846345
## Brick.Ext       0.2082198  0.19542319  0.007690759    0.143168175
```

```
## X45.Yrs.       -0.2030637 -0.15002359 -0.335551589    0.007512408
## UFFI.IN        -0.1323469 -0.22943016  0.162177296    0.044782629
## Bsmnt.Fin_SF    0.1097338  0.10579778  0.219587126   -0.076706302
## Enc.Pk.Spaces   0.4874032  0.26958765  0.268158441    0.390194693
## Central.Air     0.2184656  0.04727103  0.288322835    0.162098868
##                      Pool    Brick.Ext     X45.Yrs.      UFFI.IN
## Sale.Price      0.43331883  0.208219812 -0.203063703 -0.132346944
## Year.Sold       0.11727196  0.195423193 -0.150023587 -0.229430163
## Lot.Area        0.08990102  0.007690759 -0.335551589  0.162177296
## Living.Area_SF  0.18884635  0.143168175  0.007512408  0.044782629
## Pool            1.00000000 -0.021926450 -0.222222222 -0.097248326
## Brick.Ext      -0.02192645  1.000000000 -0.209519416 -0.002966693
## X45.Yrs.       -0.22222222 -0.209519416  1.000000000  0.073288593
## UFFI.IN        -0.09724833 -0.002966693  0.073288593  1.000000000
## Bsmnt.Fin_SF    0.11745620 -0.084710312 -0.468394189 -0.062566193
## Enc.Pk.Spaces   0.13425626 -0.045288666 -0.017212341 -0.124012036
## Central.Air     0.03251662  0.022815173 -0.139701051 -0.011732173
##                Bsmnt.Fin_SF Enc.Pk.Spaces Central.Air
## Sale.Price      0.109733802   0.487403207  0.21846564
## Year.Sold       0.105797777   0.269587651  0.04727103
## Lot.Area        0.219587126   0.268158441  0.28832284
## Living.Area_SF -0.076706302   0.390194693  0.16209887
## Pool            0.117456200   0.134256263  0.03251662
## Brick.Ext      -0.084710312  -0.045288666  0.02281517
## X45.Yrs.       -0.468394189  -0.017212341 -0.13970105
## UFFI.IN        -0.062566193  -0.124012036 -0.01173217
## Bsmnt.Fin_SF    1.000000000  -0.009129915  0.29509450
## Enc.Pk.Spaces  -0.009129915   1.000000000  0.11641494
## Central.Air     0.295094502   0.116414944  1.00000000
```

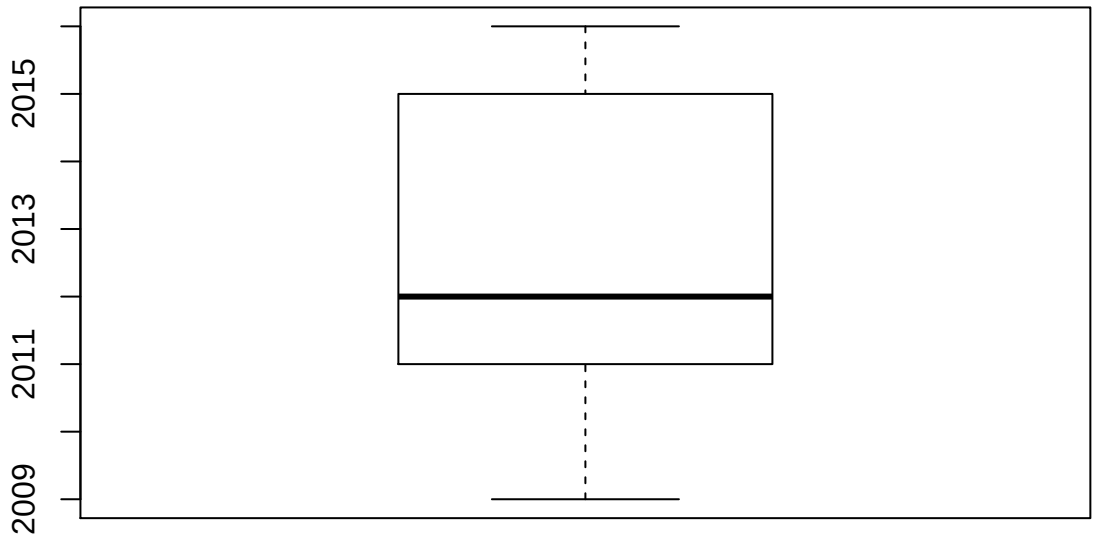
```
# plotting to determine outliers
plot(uffidata1$Sale.Price, uffidata1$Year.Sold+uffidata1$Lot.Area+uffidata1$Living.Area_SF+uffidata1$Poo
```



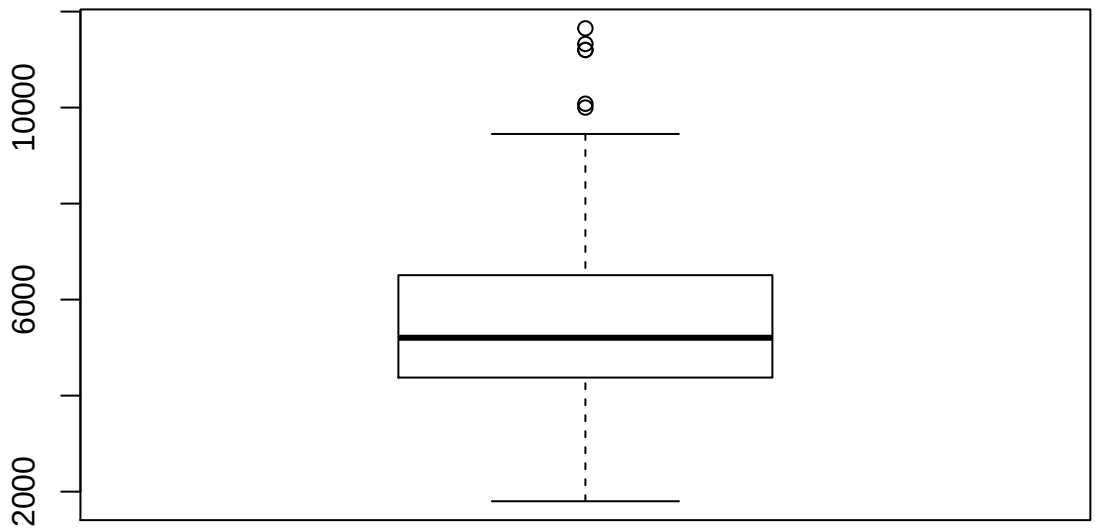

```
boxplot(uffidata1$Sale.Price, data= uffidata1)
```



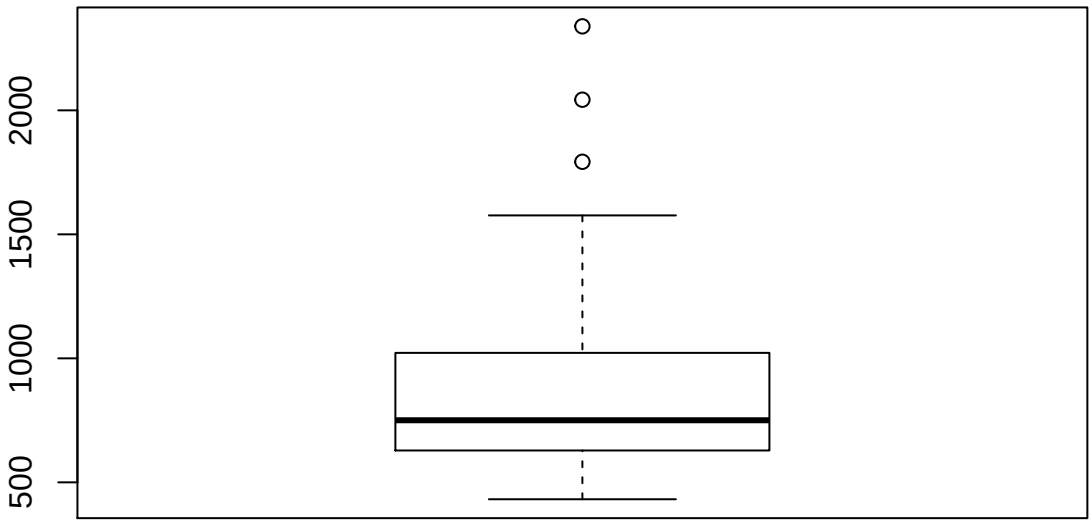

```
boxplot(uffidata1$Year.Sold, data= uffidata1)
```



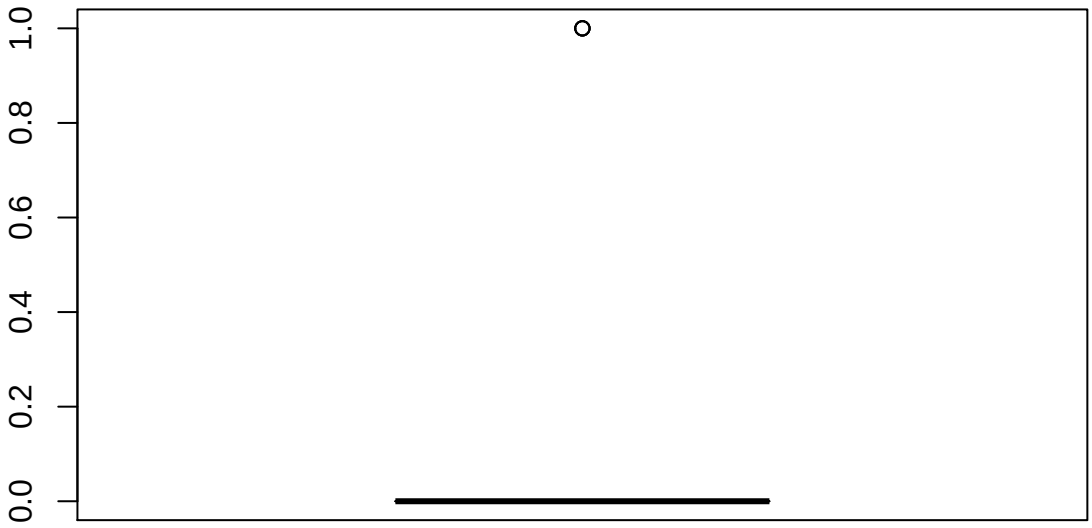

```
boxplot(uffidata1$Lot.Area, data= uffidata1)
```



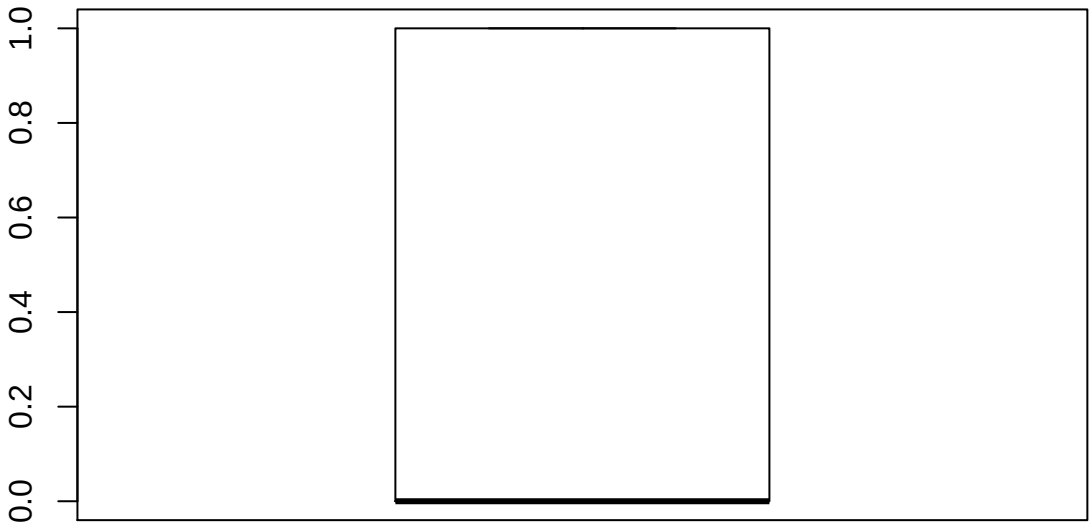

```
boxplot(uffidata1$Living.Area_SF, data= uffidata1)
```



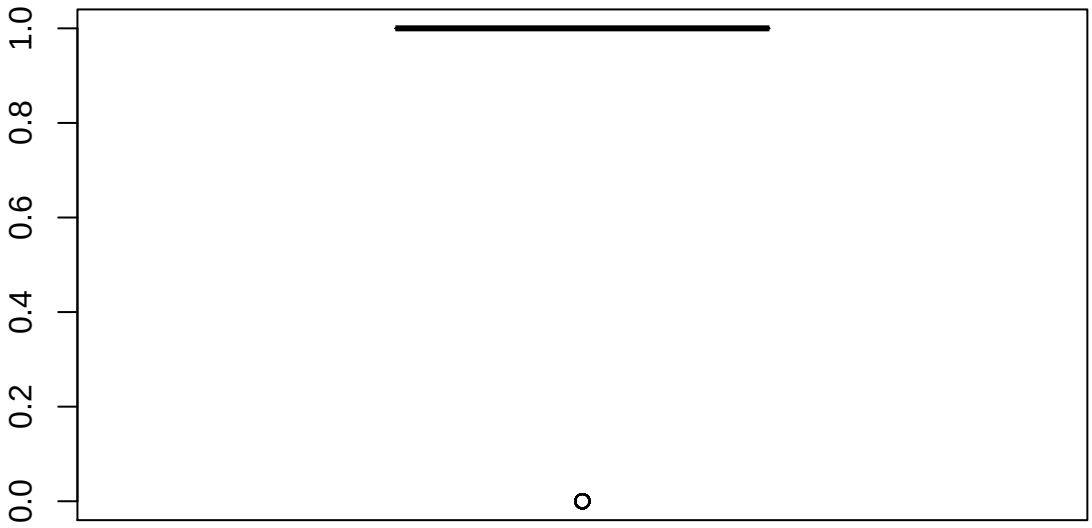

```
boxplot(uffidata1$Pool, data= uffidata1)
```



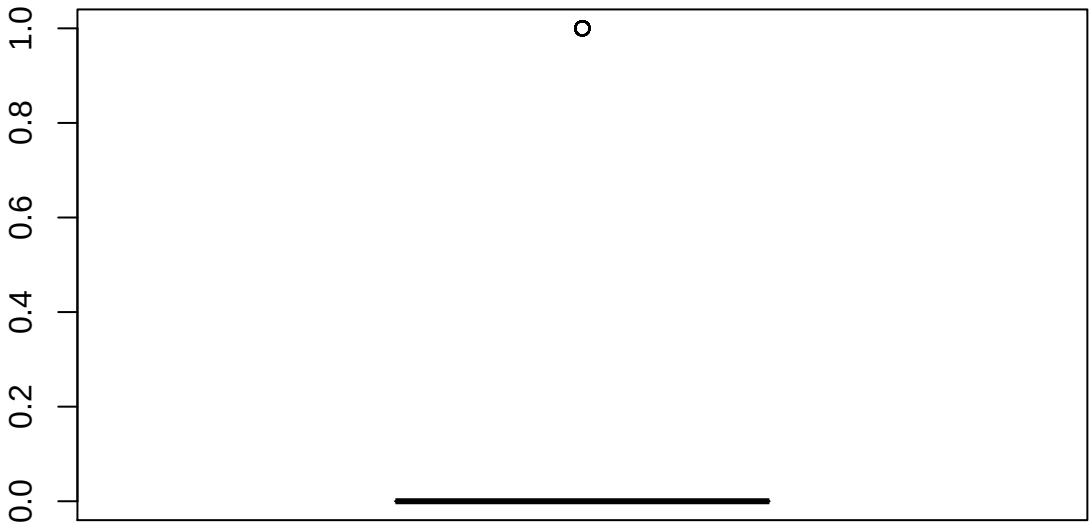

```
boxplot(uffidata1$Brick.Ext, data= uffidata1)
```



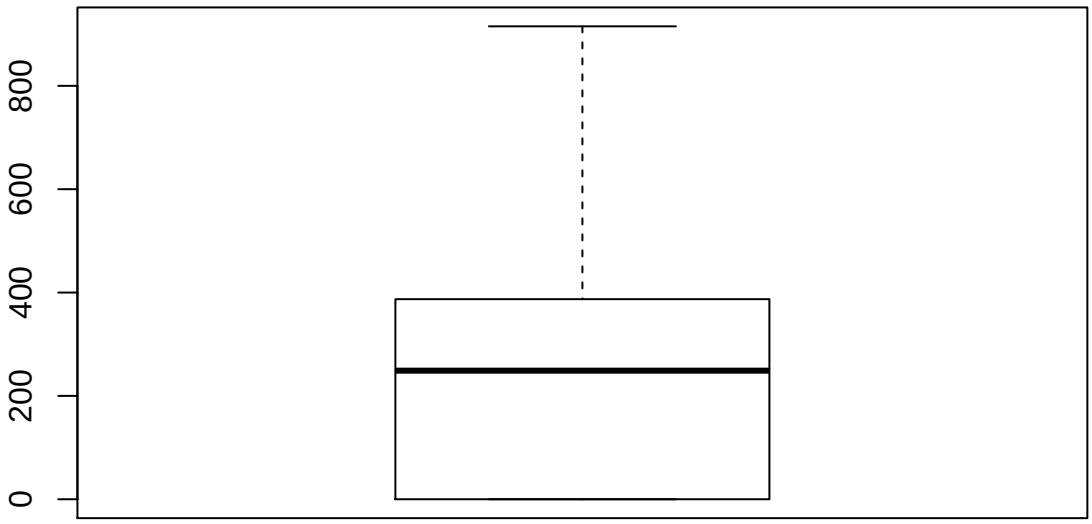

```
boxplot(uffidata1$X45.Yrs., data= uffidata1)
```



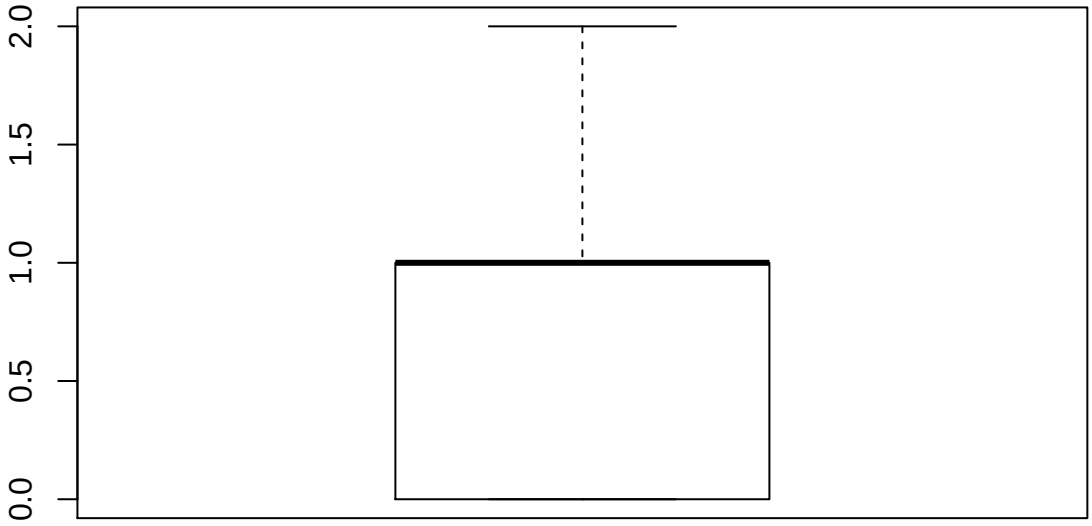

```
boxplot(uffidata1$UFFI.IN, data= uffidata1)
```



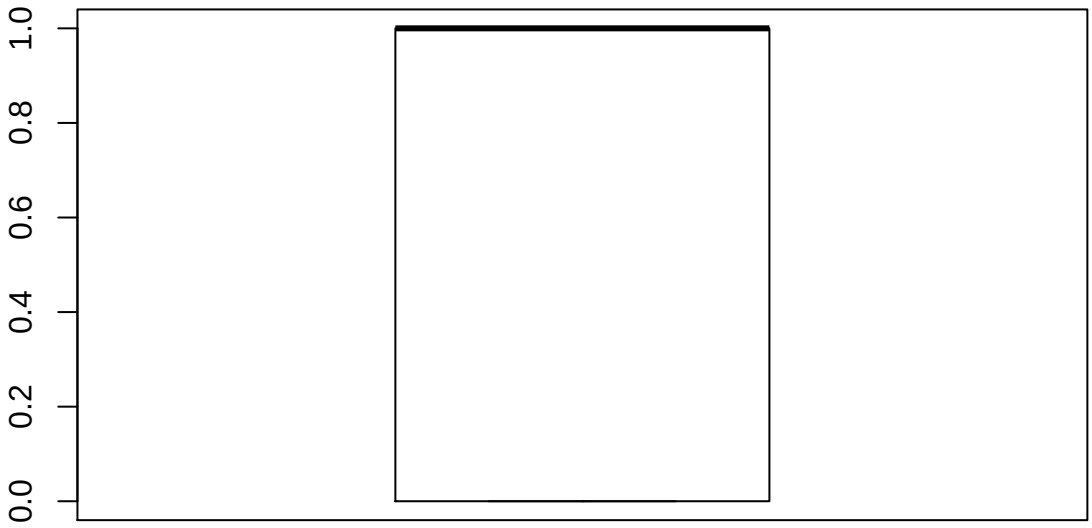

```
boxplot(uffidata1$Bsmnt.Fin_SF, data= uffidata1)
```




```
boxplot(uffidata1$Enc.Pk.Spaces, data= uffidata1)
```




```
boxplot(uffidata1$Central.Air, data= uffidata1)
```




```
# Removing outliers in Sale.Price using subset

d1 <- subset(uffidata1, uffidata1$Sale.Price < 170000)

nrow(d1)
```

```
## [1] 89
```

```
# Removing outliers in Lot.Area using subset

d2 <- subset(d1, d1$Lot.Area <= 10000)
nrow(d2)
```

```
## [1] 87
```

```
# Removing outliers in Living.Area_SF

d3 <- subset(d2, d2$Living.Area_SF < 1600)
nrow(d3)
```

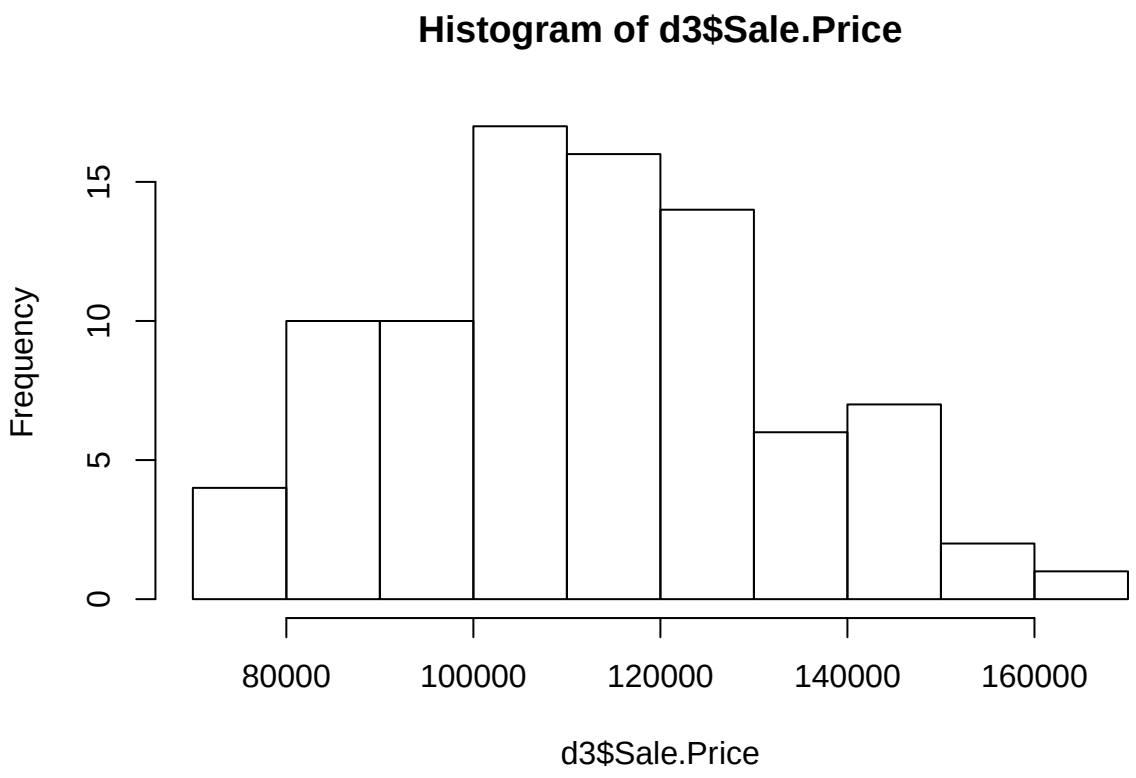
```
## [1] 87
```

```
# cannot remove pool outliers as it is a categorical variable.
```

Problem 2

Question 2

```
library("ggplot2")
hist(d3$Sale.Price)
```




```
# Yes the data is normally distributed.
```

Problem 2

Question 3

```
summary(uffidata1)
```

```
##   Observation     Year.Sold      Sale.Price        UFFI.IN
##  Min.   : 1.0   Min.   :2009   Min.   : 76900   Min.   :0.0000
##  1st Qu.:25.5   1st Qu.:2011   1st Qu.:102000   1st Qu.:0.0000
##  Median :50.0   Median :2012   Median :115000   Median :0.0000
##  Mean   :50.0   Mean   :2013   Mean   :124450   Mean   :0.2323
##  3rd Qu.:74.5   3rd Qu.:2015   3rd Qu.:135000   3rd Qu.:0.0000
##  Max.   :99.0   Max.   :2016   Max.   :347000   Max.   :1.0000
```

```
##    Brick.Ext         X45.Yrs.       Bsmnt.Fin_SF      Lot.Area
##  Min.   :0.0000   Min.   :0.0000   Min.   :  0.0   Min.   : 1800
##  1st Qu.:0.0000   1st Qu.:1.0000   1st Qu.:  0.0   1st Qu.: 4376
##  Median :0.0000   Median :1.0000   Median :248.8   Median : 5205
##  Mean   :0.3939   Mean   :0.8182   Mean   :248.0   Mean   : 5709
##  3rd Qu.:1.0000   3rd Qu.:1.0000   3rd Qu.:387.2   3rd Qu.: 6509
##  Max.   :1.0000   Max.   :1.0000   Max.   :915.1   Max.   :11650
##  Enc.Pk.Spaces    Living.Area_SF    Central.Air          Pool
##  Min.   :0.0000   Min.   : 431.9   Min.   :0.0000   Min.   :0.0000
##  1st Qu.:0.0000   1st Qu.: 628.5   1st Qu.:0.0000   1st Qu.:0.0000
##  Median :1.0000   Median : 750.3   Median :1.0000   Median :0.0000
##  Mean   :0.8081   Mean   : 858.4   Mean   :0.5758   Mean   :0.0303
##  3rd Qu.:1.0000   3rd Qu.:1022.1   3rd Qu.:1.0000   3rd Qu.:0.0000
##  Max.   :2.0000   Max.   :2338.7   Max.   :1.0000   Max.   :1.0000
```

```
library(psych)
cor(d3[c("Sale.Price","Year.Sold","Lot.Area","Living.Area_SF","Pool","Brick.Ext","X45.Yrs.","UFFI.IN","
```

```
##                 Sale.Price   Year.Sold    Lot.Area Living.Area_SF
## Sale.Price      1.00000000  0.61734157  0.18260972     0.42789620
## Year.Sold       0.61734157  1.00000000  0.12496624     0.14344914
## Lot.Area        0.18260972  0.12496624  1.00000000     0.04920991
## Living.Area_SF  0.42789620  0.14344914  0.04920991     1.00000000
## Pool            0.04452764 -0.11113943  0.07971132    -0.09508972
## Brick.Ext       0.20246983  0.25336849 -0.02724765     0.11432254
## X45.Yrs.       -0.10019853 -0.07643946 -0.40529831     0.09857677
## UFFI.IN        -0.32099272 -0.26315203  0.03213969     0.01404512
## Bsmnt.Fin_SF    0.14085998  0.06267197  0.33369273    -0.13694001
## Enc.Pk.Spaces   0.24402830  0.12885573  0.09513450     0.06355314
## Central.Air     0.08726594 -0.03872293  0.26304503     0.03474696
##                       Pool   Brick.Ext     X45.Yrs.      UFFI.IN
## Sale.Price      0.04452764  0.20246983 -0.100198528 -0.320992720
## Year.Sold      -0.11113943  0.25336849 -0.076439458 -0.263152027
## Lot.Area        0.07971132 -0.02724765 -0.405298308  0.032139685
## Living.Area_SF -0.09508972  0.11432254  0.098576768  0.014045119
## Pool            1.00000000 -0.08636789 -0.246234094 -0.056999772
## Brick.Ext      -0.08636789  1.00000000 -0.226222363  0.032768862
## X45.Yrs.       -0.24623409 -0.22622236  1.000000000  0.004351243
## UFFI.IN        -0.05699977  0.03276886  0.004351243  1.000000000
## Bsmnt.Fin_SF    0.12533047 -0.03073115 -0.488032305 -0.075726210
## Enc.Pk.Spaces  -0.12053641 -0.10662455  0.140435948 -0.147334427
## Central.Air     0.09947910 -0.01738576 -0.090179047 -0.014757665
##                Bsmnt.Fin_SF Enc.Pk.Spaces Central.Air
## Sale.Price       0.14085998    0.24402830  0.08726594
## Year.Sold        0.06267197    0.12885573 -0.03872293
## Lot.Area         0.33369273    0.09513450  0.26304503
## Living.Area_SF  -0.13694001    0.06355314  0.03474696
## Pool             0.12533047   -0.12053641  0.09947910
## Brick.Ext       -0.03073115   -0.10662455 -0.01738576
## X45.Yrs.        -0.48803231    0.14043595 -0.09017905
## UFFI.IN         -0.07572621   -0.14733443 -0.01475767
## Bsmnt.Fin_SF     1.00000000   -0.06153985  0.28465525
## Enc.Pk.Spaces   -0.06153985    1.00000000  0.03845919
## Central.Air      0.28465525    0.03845919  1.00000000
```

Problem 2

Question 3

```
cor(d3[c("UFFI.IN","Sale.Price")])
```

```
##                UFFI.IN Sale.Price
## UFFI.IN     1.0000000 -0.3209927
## Sale.Price -0.3209927  1.0000000
```

```
# No its not sufficient
```

Problem 2

Question 4

```
mod_2 <- lm(Sale.Price ~ ., data = uffidata1)
summary(mod_2)
```

```
##
## Call:
## lm(formula = Sale.Price ~ ., data = uffidata1)
##
## Residuals:
##    Min     1Q Median     3Q    Max
## -59011 -10170   -947   9131  93999
##
## Coefficients:
##                   Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -9.342e+06  2.149e+06  -4.348 3.72e-05 ***
## Observation     2.899e+01  1.009e+02   0.287  0.77463
## Year.Sold       4.666e+03  1.069e+03   4.366 3.47e-05 ***
## UFFI.IN        -5.840e+03  5.305e+03  -1.101  0.27401
## Brick.Ext       8.455e+03  4.629e+03   1.827  0.07119 .
## X45.Yrs.        3.007e+02  8.618e+03   0.035  0.97225
## Bsmnt.Fin_SF    7.851e+00  1.048e+01   0.749  0.45575
## Lot.Area        2.228e+00  1.295e+00   1.720  0.08898 .
## Enc.Pk.Spaces   9.523e+03  3.351e+03   2.842  0.00559 **
## Living.Area_SF  5.419e+01  7.619e+00   7.112 3.03e-10 ***
## Central.Air     4.198e+03  4.588e+03   0.915  0.36266
## Pool            6.366e+04  1.267e+04   5.026 2.66e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 20360 on 87 degrees of freedom
## Multiple R-squared:  0.7739, Adjusted R-squared:  0.7454
## F-statistic: 27.08 on 11 and 87 DF,  p-value: < 2.2e-16
```

```
# It is not a significant variable
```

Problem 2

Question 5

```r
# Splitting the data

library(caTools)

split <- sample.split(d3, SplitRatio = 0.8)
training_uffi <- subset(d3, split == TRUE)
testing_uffi <- subset(d3, split == FALSE)

# Building the model
uffi_mod1 <- lm(Sale.Price ~ ., data = training_uffi)
summary(uffi_mod1)
```

```
##
## Call:
## lm(formula = Sale.Price ~ ., data = training_uffi)
##
## Residuals:
##    Min     1Q Median     3Q    Max
## -32197  -6690  -1382   7069  22127
##
## Coefficients:
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -9.742e+06  1.709e+06  -5.699 5.73e-07 ***
## Observation    -6.228e+01  7.750e+01  -0.804  0.42524
## Year.Sold       4.882e+03  8.508e+02   5.739 4.96e-07 ***
## UFFI.IN        -5.851e+03  4.267e+03  -1.371  0.17616
## Brick.Ext       5.382e+03  3.813e+03   1.411  0.16410
## X45.Yrs.       -2.959e+03  7.351e+03  -0.403  0.68891
## Bsmnt.Fin_SF    4.964e+00  9.045e+00   0.549  0.58548
## Lot.Area        7.504e-01  1.196e+00   0.627  0.53314
## Enc.Pk.Spaces   6.162e+03  2.660e+03   2.317  0.02449 *
## Living.Area_SF  3.173e+01  7.631e+00   4.159  0.00012 ***
## Central.Air     4.012e+03  3.491e+03   1.150  0.25560
## Pool            2.599e+04  1.418e+04   1.833  0.07260 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 12690 on 52 degrees of freedom
## Multiple R-squared:  0.6488, Adjusted R-squared:  0.5745
## F-statistic: 8.734 on 11 and 52 DF,  p-value: 1.664e-08
```

```r
# Backfitting
# Removing feature with highest p-value (Observation)
uffi_mod2 <- lm(Sale.Price ~ Year.Sold + UFFI.IN + Brick.Ext + X45.Yrs. + Bsmnt.Fin_SF + Lot.Area + Enc

summary(uffi_mod2)
```

```
##
## Call:
```

```
## lm(formula = Sale.Price ~ Year.Sold + UFFI.IN + Brick.Ext + X45.Yrs. +
##     Bsmnt.Fin_SF + Lot.Area + Enc.Pk.Spaces + Living.Area_SF +
##     Central.Air + Pool, data = training_uffi)
##
## Residuals:
##    Min     1Q Median     3Q    Max
## -32958  -7805  -1530   7979  22213
##
## Coefficients:
##                   Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -9.882e+06  1.695e+06  -5.831 3.36e-07 ***
## Year.Sold       4.949e+03  8.438e+02   5.866 2.96e-07 ***
## UFFI.IN        -6.302e+03  4.215e+03  -1.495  0.14088
## Brick.Ext       4.757e+03  3.721e+03   1.279  0.20661
## X45.Yrs.       -5.492e+02  6.689e+03  -0.082  0.93487
## Bsmnt.Fin_SF    4.141e+00  8.957e+00   0.462  0.64575
## Lot.Area        8.400e-01  1.187e+00   0.708  0.48222
## Enc.Pk.Spaces   6.082e+03  2.649e+03   2.296  0.02567 *
## Living.Area_SF  3.132e+01  7.588e+00   4.128  0.00013 ***
## Central.Air     3.793e+03  3.468e+03   1.094  0.27910
## Pool            2.515e+04  1.409e+04   1.784  0.08013 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 12640 on 53 degrees of freedom
## Multiple R-squared:  0.6445, Adjusted R-squared:  0.5774
## F-statistic: 9.607 on 10 and 53 DF,  p-value: 6.898e-09
```

```
# Removing X45Yrs.

uffi_mod3 <- lm(Sale.Price ~ Year.Sold + UFFI.IN + Brick.Ext + Bsmnt.Fin_SF + Lot.Area + Enc.Pk.Spaces +

summary(uffi_mod3)
```

```
##
## Call:
## lm(formula = Sale.Price ~ Year.Sold + UFFI.IN + Brick.Ext + Bsmnt.Fin_SF +
##     Lot.Area + Enc.Pk.Spaces + Living.Area_SF + Central.Air +
##     Pool, data = training_uffi)
##
## Residuals:
##    Min     1Q Median     3Q    Max
## -33148  -7692  -1434   7962  22099
##
## Coefficients:
##                   Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -9.859e+06  1.657e+06  -5.949 2.06e-07 ***
## Year.Sold       4.938e+03  8.245e+02   5.989 1.77e-07 ***
## UFFI.IN        -6.332e+03  4.160e+03  -1.522 0.133788
## Brick.Ext       4.885e+03  3.350e+03   1.458 0.150586
## Bsmnt.Fin_SF    4.560e+00  7.294e+00   0.625 0.534513
## Lot.Area        8.634e-01  1.141e+00   0.757 0.452628
## Enc.Pk.Spaces   6.057e+03  2.607e+03   2.323 0.023965 *
## Living.Area_SF  3.138e+01  7.489e+00   4.190 0.000104 ***
## Central.Air     3.753e+03  3.402e+03   1.103 0.274907
```

```
## Pool            2.552e+04  1.321e+04   1.931 0.058685 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 12530 on 54 degrees of freedom
## Multiple R-squared:  0.6444, Adjusted R-squared:  0.5852
## F-statistic: 10.87 on 9 and 54 DF,  p-value: 2.008e-09
```

```
# Removing UFFIin

uffi_mod4 <- lm(Sale.Price ~ Year.Sold + Brick.Ext + Bsmnt.Fin_SF + Lot.Area + Enc.Pk.Spaces + Living.Ar

summary(uffi_mod4)
```

```
##
## Call:
## lm(formula = Sale.Price ~ Year.Sold + Brick.Ext + Bsmnt.Fin_SF +
##     Lot.Area + Enc.Pk.Spaces + Living.Area_SF + Central.Air +
##     Pool, data = training_uffi)
##
## Residuals:
##    Min     1Q Median     3Q    Max
## -33299  -8001   -670   9091  22029
##
## Coefficients:
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -1.044e+07  1.632e+06  -6.398 3.64e-08 ***
## Year.Sold       5.227e+03  8.119e+02   6.438 3.13e-08 ***
## Brick.Ext       4.203e+03  3.359e+03   1.251   0.2162
## Bsmnt.Fin_SF    5.076e+00  7.373e+00   0.688   0.4940
## Lot.Area        4.966e-01  1.129e+00   0.440   0.6617
## Enc.Pk.Spaces   6.677e+03  2.606e+03   2.562   0.0132 *
## Living.Area_SF  3.191e+01  7.570e+00   4.215 9.37e-05 ***
## Central.Air     3.710e+03  3.443e+03   1.078   0.2859
## Pool            2.802e+04  1.327e+04   2.112   0.0393 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 12680 on 55 degrees of freedom
## Multiple R-squared:  0.6292, Adjusted R-squared:  0.5752
## F-statistic: 11.66 on 8 and 55 DF,  p-value: 1.61e-09
```

```
# Removing CentralAir

uffi_mod5 <- lm(Sale.Price ~ Year.Sold + Brick.Ext + Bsmnt.Fin_SF + Lot.Area + Enc.Pk.Spaces + Living.Ar

summary(uffi_mod5)
```

```
##
## Call:
## lm(formula = Sale.Price ~ Year.Sold + Brick.Ext + Bsmnt.Fin_SF +
##     Lot.Area + Enc.Pk.Spaces + Living.Area_SF + Pool, data = training_uffi)
##
## Residuals:
##    Min     1Q Median     3Q    Max
## -34945  -7602    -41   8521  24026
```

```
##
## Coefficients:
##                   Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -1.020e+07  1.619e+06  -6.300 4.92e-08 ***
## Year.Sold       5.106e+03  8.052e+02   6.341 4.21e-08 ***
## Brick.Ext       4.172e+03  3.364e+03   1.240   0.2201
## Bsmnt.Fin_SF    6.307e+00  7.295e+00   0.865   0.3909
## Lot.Area        6.891e-01  1.116e+00   0.617   0.5395
## Enc.Pk.Spaces   6.923e+03  2.599e+03   2.663   0.0101 *
## Living.Area_SF  3.338e+01  7.455e+00   4.478 3.75e-05 ***
## Pool            2.928e+04  1.323e+04   2.212   0.0311 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 12690 on 56 degrees of freedom
## Multiple R-squared:  0.6213, Adjusted R-squared:  0.574
## F-statistic: 13.13 on 7 and 56 DF,  p-value: 7.233e-10
```

```
# Removing BsmntFin_SF

uffi_mod6 <- lm(Sale.Price ~ Year.Sold + Brick.Ext + Lot.Area + Enc.Pk.Spaces + Living.Area_SF + Pool, d

summary(uffi_mod6)
```

```
##
## Call:
## lm(formula = Sale.Price ~ Year.Sold + Brick.Ext + Lot.Area +
##     Enc.Pk.Spaces + Living.Area_SF + Pool, data = training_uffi)
##
## Residuals:
##    Min     1Q Median     3Q    Max
## -32193  -7355    307   8690  25119
##
## Coefficients:
##                   Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -1.031e+07  1.610e+06  -6.406 3.09e-08 ***
## Year.Sold       5.163e+03  8.007e+02   6.447 2.64e-08 ***
## Brick.Ext       4.173e+03  3.357e+03   1.243   0.2188
## Lot.Area        1.058e+00  1.029e+00   1.028   0.3085
## Enc.Pk.Spaces   6.712e+03  2.582e+03   2.600   0.0119 *
## Living.Area_SF  3.235e+01  7.342e+00   4.406 4.70e-05 ***
## Pool            3.024e+04  1.316e+04   2.298   0.0252 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 12670 on 57 degrees of freedom
## Multiple R-squared:  0.6163, Adjusted R-squared:  0.5759
## F-statistic: 15.26 on 6 and 57 DF,  p-value: 2.486e-10
```

```
# Removing BrickExt

uffi_mod7 <- lm(Sale.Price ~ Year.Sold + Lot.Area + Enc.Pk.Spaces + Living.Area_SF + Pool, data = train

summary(uffi_mod7)
```

```
##
```

```
## Call:
## lm(formula = Sale.Price ~ Year.Sold + Lot.Area + Enc.Pk.Spaces +
##     Living.Area_SF + Pool, data = training_uffi)
##
## Residuals:
##    Min     1Q Median     3Q    Max
## -34574  -8395    684   8367  27028
##
## Coefficients:
##                   Estimate Std. Error t value Pr(>|t|)
## (Intercept)    -1.058e+07  1.603e+06  -6.601 1.37e-08 ***
## Year.Sold       5.297e+03  7.971e+02   6.645 1.16e-08 ***
## Lot.Area        8.929e-01  1.026e+00   0.871   0.3875
## Enc.Pk.Spaces   6.444e+03  2.585e+03   2.493   0.0156 *
## Living.Area_SF  3.287e+01  7.364e+00   4.464 3.77e-05 ***
## Pool            2.902e+04  1.318e+04   2.201   0.0317 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 12720 on 58 degrees of freedom
## Multiple R-squared:  0.6059, Adjusted R-squared:  0.5719
## F-statistic: 17.83 on 5 and 58 DF,  p-value: 1.144e-10
```

```
#This is the ideal multile regression model for predicting home prices as overall p-value is greater th
#Adjusted R-squared : 0.6621
#p-values of principal components can be seen above.

# Predicting Sale Price
uffi_pred <- predict(uffi_mod7,testing_uffi)
uffi_pred
```

```
##         1         2         4        13        14        16        25
##  98202.16  83888.63  94194.14 102840.59 100068.60 103364.26 116166.01
##        26        28        37        38        40        49        50
## 110511.66  94886.48 120274.77 112363.11 118957.92 133435.01 132277.06
##        52        61        62        64        73        74        76
## 118225.50 120515.81 116974.47 128739.14 119260.87 138908.42 131628.30
##        87        88
##  95798.34 139418.24
```

```
# RSME
sqerr_uffi <- (uffidata1[3] - uffi_pred)^2
msqerr_uffi <- mean(sqerr_uffi)
rmse_uffi <- sqrt(msqerr_uffi)
rmse_uffi
```

```
## [1] 45122.02
```

Problem 2

Question 6

```
cor(d3[c("UFFI.IN","Sale.Price")])
```

```
##                UFFI.IN Sale.Price
## UFFI.IN     1.0000000 -0.3209927
## Sale.Price -0.3209927  1.0000000
```

```
# UFFI will decrease the value of the property
```

Problem 2

Question 7

```
# Prediction without UFFI
#case 1 - with UFFI and other given predictors

A1 <- data.frame(100,2018,0,1,1,1,0,5000,2,1700,1,0) #assuming the home was recently purchased and we a
names(A1) <- c("Observation", "Year.Sold", "Sale.Price","UFFI.IN","Brick.Ext", "X45.Yrs.", "Bsmnt.Fin_SF
A1
```

```
##   Observation Year.Sold Sale.Price UFFI.IN Brick.Ext X45.Yrs. Bsmnt.Fin_SF
## 1         100      2018          0       1         1        1            0
##   Lot.Area Enc.Pk.Spaces Living.Area_SF Central.Air Pool
## 1     5000             2           1700           1    0
```

```
A1forecast <- predict (uffi_mod1, A1)
A1forecast
```

```
##        1
## 174823.2
```

```
#case 2 - without UFFI and other given predictors


A2 <- data.frame(100,2018,'',0,1,1,0,5000,2,1700,1,0)

names(A2) <- c("Observation", "Year.Sold", "Sale.Price","UFFI.IN","Brick.Ext", "X45.Yrs.", "Bsmnt.Fin_SF

A2forecast <- predict (uffi_mod1, A2)
A2forecast
```

```
##      1
## 180674
```

```
#lets use the standard erro for model1 = 11160


#95% confidence interval with UFFI

A1_Upper <- A1forecast -1.96*11160  #we can also use UFFImodel1summary$
```

```r
summary_of_model<- summary(uffi_mod1)


A1_Lower <- A1forecast  + 1.96*11160
A1_Upper
```

```
##        1
## 152949.6
```

```r
A1_Lower
```

```
##        1
## 196696.8
```

```r
#95% confidence interval without UFFI

A2_Upper <- A2forecast -1.96*11160

A2_Lower <- A2forecast  + 1.96*11160
A2_Upper
```

```
##        1
## 158800.4
```

```r
A2_Lower
```

```
##        1
## 202547.6
```

Problem 2

Question 8

```r
#$203,066.6 is the predicted value and hence the client overpayed by $27,868.7
```

Problem 3

Question 1

```r
data_3 <- read.csv("C:/Users/Meghana Nadig/Downloads/titanic_data.csv", stringsAsFactors = FALSE)

# Making dependent variable as a factor
data_3$Survived <- as.factor(data_3$Survived)
data_3
```

```
##     PassengerId Survived Pclass
## 1             1        0      3
## 2             2        1      1
## 3             3        1      3
## 4             4        1      1
```

```
## 5             5        0       3
## 6             6        0       3
## 7             7        0       1
## 8             8        0       3
## 9             9        1       3
## 10           10        1       2
## 11           11        1       3
## 12           12        1       1
## 13           13        0       3
## 14           14        0       3
## 15           15        0       3
## 16           16        1       2
## 17           17        0       3
## 18           18        1       2
## 19           19        0       3
## 20           20        1       3
## 21           21        0       2
## 22           22        1       2
## 23           23        1       3
## 24           24        1       1
## 25           25        0       3
## 26           26        1       3
## 27           27        0       3
## 28           28        0       1
## 29           29        1       3
## 30           30        0       3
## 31           31        0       1
## 32           32        1       1
## 33           33        1       3
## 34           34        0       2
## 35           35        0       1
## 36           36        0       1
## 37           37        1       3
## 38           38        0       3
## 39           39        0       3
## 40           40        1       3
## 41           41        0       3
## 42           42        0       2
## 43           43        0       3
## 44           44        1       2
## 45           45        1       3
## 46           46        0       3
## 47           47        0       3
## 48           48        1       3
## 49           49        0       3
## 50           50        0       3
## 51           51        0       3
## 52           52        0       3
## 53           53        1       1
## 54           54        1       2
## 55           55        0       1
## 56           56        1       1
## 57           57        1       2
## 58           58        0       3
```

```
## 59          59        1      2
## 60          60        0      3
## 61          61        0      3
## 62          62        1      1
## 63          63        0      1
## 64          64        0      3
## 65          65        0      1
## 66          66        1      3
## 67          67        1      2
## 68          68        0      3
## 69          69        1      3
## 70          70        0      3
## 71          71        0      2
## 72          72        0      3
## 73          73        0      2
## 74          74        0      3
## 75          75        1      3
## 76          76        0      3
## 77          77        0      3
## 78          78        0      3
## 79          79        1      2
## 80          80        1      3
## 81          81        0      3
## 82          82        1      3
## 83          83        1      3
## 84          84        0      1
## 85          85        1      2
## 86          86        1      3
## 87          87        0      3
## 88          88        0      3
## 89          89        1      1
## 90          90        0      3
## 91          91        0      3
## 92          92        0      3
## 93          93        0      1
## 94          94        0      3
## 95          95        0      3
## 96          96        0      3
## 97          97        0      1
## 98          98        1      1
## 99          99        1      2
## 100        100        0      2
## 101        101        0      3
## 102        102        0      3
## 103        103        0      1
## 104        104        0      3
## 105        105        0      3
## 106        106        0      3
## 107        107        1      3
## 108        108        1      3
## 109        109        0      3
## 110        110        1      3
## 111        111        0      1
## 112        112        0      3
```

```
## 113         113         0       3
## 114         114         0       3
## 115         115         0       3
## 116         116         0       3
## 117         117         0       3
## 118         118         0       2
## 119         119         0       1
## 120         120         0       3
## 121         121         0       2
## 122         122         0       3
## 123         123         0       2
## 124         124         1       2
## 125         125         0       1
## 126         126         1       3
## 127         127         0       3
## 128         128         1       3
## 129         129         1       3
## 130         130         0       3
## 131         131         0       3
## 132         132         0       3
## 133         133         0       3
## 134         134         1       2
## 135         135         0       2
## 136         136         0       2
## 137         137         1       1
## 138         138         0       1
## 139         139         0       3
## 140         140         0       1
## 141         141         0       3
## 142         142         1       3
## 143         143         1       3
## 144         144         0       3
## 145         145         0       2
## 146         146         0       2
## 147         147         1       3
## 148         148         0       3
## 149         149         0       2
## 150         150         0       2
## 151         151         0       2
## 152         152         1       1
## 153         153         0       3
## 154         154         0       3
## 155         155         0       3
## 156         156         0       1
## 157         157         1       3
## 158         158         0       3
## 159         159         0       3
## 160         160         0       3
## 161         161         0       3
## 162         162         1       2
## 163         163         0       3
## 164         164         0       3
## 165         165         0       3
## 166         166         1       3
```

```
## 167          167         1       1
## 168          168         0       3
## 169          169         0       1
## 170          170         0       3
## 171          171         0       1
## 172          172         0       3
## 173          173         1       3
## 174          174         0       3
## 175          175         0       1
## 176          176         0       3
## 177          177         0       3
## 178          178         0       1
## 179          179         0       2
## 180          180         0       3
## 181          181         0       3
## 182          182         0       2
## 183          183         0       3
## 184          184         1       2
## 185          185         1       3
## 186          186         0       1
## 187          187         1       3
## 188          188         1       1
## 189          189         0       3
## 190          190         0       3
## 191          191         1       2
## 192          192         0       2
## 193          193         1       3
## 194          194         1       2
## 195          195         1       1
## 196          196         1       1
## 197          197         0       3
## 198          198         0       3
## 199          199         1       3
## 200          200         0       2
## 201          201         0       3
## 202          202         0       3
## 203          203         0       3
## 204          204         0       3
## 205          205         1       3
## 206          206         0       3
## 207          207         0       3
## 208          208         1       3
## 209          209         1       3
## 210          210         1       1
## 211          211         0       3
## 212          212         1       2
## 213          213         0       3
## 214          214         0       2
## 215          215         0       3
## 216          216         1       1
## 217          217         1       3
## 218          218         0       2
## 219          219         1       1
## 220          220         0       2
```

```
## 221          221          1          3
## 222          222          0          2
## 223          223          0          3
## 224          224          0          3
## 225          225          1          1
## 226          226          0          3
## 227          227          1          2
## 228          228          0          3
## 229          229          0          2
## 230          230          0          3
## 231          231          1          1
## 232          232          0          3
## 233          233          0          2
## 234          234          1          3
## 235          235          0          2
## 236          236          0          3
## 237          237          0          2
## 238          238          1          2
## 239          239          0          2
## 240          240          0          2
## 241          241          0          3
## 242          242          1          3
## 243          243          0          2
## 244          244          0          3
## 245          245          0          3
## 246          246          0          1
## 247          247          0          3
## 248          248          1          2
## 249          249          1          1
## 250          250          0          2
## 251          251          0          3
## 252          252          0          3
## 253          253          0          1
## 254          254          0          3
## 255          255          0          3
## 256          256          1          3
## 257          257          1          1
## 258          258          1          1
## 259          259          1          1
## 260          260          1          2
## 261          261          0          3
## 262          262          1          3
## 263          263          0          1
## 264          264          0          1
## 265          265          0          3
## 266          266          0          2
## 267          267          0          3
## 268          268          1          3
## 269          269          1          1
## 270          270          1          1
## 271          271          0          1
## 272          272          1          3
## 273          273          1          2
## 274          274          0          1
```

```
## 275          275         1       3
## 276          276         1       1
## 277          277         0       3
## 278          278         0       2
## 279          279         0       3
## 280          280         1       3
## 281          281         0       3
## 282          282         0       3
## 283          283         0       3
## 284          284         1       3
## 285          285         0       1
## 286          286         0       3
## 287          287         1       3
## 288          288         0       3
## 289          289         1       2
## 290          290         1       3
## 291          291         1       1
## 292          292         1       1
## 293          293         0       2
## 294          294         0       3
## 295          295         0       3
## 296          296         0       1
## 297          297         0       3
## 298          298         0       1
## 299          299         1       1
## 300          300         1       1
## 301          301         1       3
## 302          302         1       3
## 303          303         0       3
## 304          304         1       2
## 305          305         0       3
## 306          306         1       1
## 307          307         1       1
## 308          308         1       1
## 309          309         0       2
## 310          310         1       1
## 311          311         1       1
## 312          312         1       1
## 313          313         0       2
## 314          314         0       3
## 315          315         0       2
## 316          316         1       3
## 317          317         1       2
## 318          318         0       2
## 319          319         1       1
## 320          320         1       1
## 321          321         0       3
## 322          322         0       3
## 323          323         1       2
## 324          324         1       2
## 325          325         0       3
## 326          326         1       1
## 327          327         0       3
## 328          328         1       2
```

```
## 329          329         1       3
## 330          330         1       1
## 331          331         1       3
## 332          332         0       1
## 333          333         0       1
## 334          334         0       3
## 335          335         1       1
## 336          336         0       3
## 337          337         0       1
## 338          338         1       1
## 339          339         1       3
## 340          340         0       1
## 341          341         1       2
## 342          342         1       1
## 343          343         0       2
## 344          344         0       2
## 345          345         0       2
## 346          346         1       2
## 347          347         1       2
## 348          348         1       3
## 349          349         1       3
## 350          350         0       3
## 351          351         0       3
## 352          352         0       1
## 353          353         0       3
## 354          354         0       3
## 355          355         0       3
## 356          356         0       3
## 357          357         1       1
## 358          358         0       2
## 359          359         1       3
## 360          360         1       3
## 361          361         0       3
## 362          362         0       2
## 363          363         0       3
## 364          364         0       3
## 365          365         0       3
## 366          366         0       3
## 367          367         1       1
## 368          368         1       3
## 369          369         1       3
## 370          370         1       1
## 371          371         1       1
## 372          372         0       3
## 373          373         0       3
## 374          374         0       1
## 375          375         0       3
## 376          376         1       1
## 377          377         1       3
## 378          378         0       1
## 379          379         0       3
## 380          380         0       3
## 381          381         1       1
## 382          382         1       3
```

```
## 383         383         0       3
## 384         384         1       1
## 385         385         0       3
## 386         386         0       2
## 387         387         0       3
## 388         388         1       2
## 389         389         0       3
## 390         390         1       2
## 391         391         1       1
## 392         392         1       3
## 393         393         0       3
## 394         394         1       1
## 395         395         1       3
## 396         396         0       3
## 397         397         0       3
## 398         398         0       2
## 399         399         0       2
## 400         400         1       2
## 401         401         1       3
## 402         402         0       3
## 403         403         0       3
## 404         404         0       3
## 405         405         0       3
## 406         406         0       2
## 407         407         0       3
## 408         408         1       2
## 409         409         0       3
## 410         410         0       3
## 411         411         0       3
## 412         412         0       3
## 413         413         1       1
## 414         414         0       2
## 415         415         1       3
## 416         416         0       3
## 417         417         1       2
## 418         418         1       2
## 419         419         0       2
## 420         420         0       3
## 421         421         0       3
## 422         422         0       3
## 423         423         0       3
## 424         424         0       3
## 425         425         0       3
## 426         426         0       3
## 427         427         1       2
## 428         428         1       2
## 429         429         0       3
## 430         430         1       3
## 431         431         1       1
## 432         432         1       3
## 433         433         1       2
## 434         434         0       3
## 435         435         0       1
## 436         436         1       1
```

```
## 437         437         0       3
## 438         438         1       2
## 439         439         0       1
## 440         440         0       2
## 441         441         1       2
## 442         442         0       3
## 443         443         0       3
## 444         444         1       2
## 445         445         1       3
## 446         446         1       1
## 447         447         1       2
## 448         448         1       1
## 449         449         1       3
## 450         450         1       1
## 451         451         0       2
## 452         452         0       3
## 453         453         0       1
## 454         454         1       1
## 455         455         0       3
## 456         456         1       3
## 457         457         0       1
## 458         458         1       1
## 459         459         1       2
## 460         460         0       3
## 461         461         1       1
## 462         462         0       3
## 463         463         0       1
## 464         464         0       2
## 465         465         0       3
## 466         466         0       3
## 467         467         0       2
## 468         468         0       1
## 469         469         0       3
## 470         470         1       3
## 471         471         0       3
## 472         472         0       3
## 473         473         1       2
## 474         474         1       2
## 475         475         0       3
## 476         476         0       1
## 477         477         0       2
## 478         478         0       3
## 479         479         0       3
## 480         480         1       3
## 481         481         0       3
## 482         482         0       2
## 483         483         0       3
## 484         484         1       3
## 485         485         1       1
## 486         486         0       3
## 487         487         1       1
## 488         488         0       1
## 489         489         0       3
## 490         490         1       3
```

```
## 491         491         0       3
## 492         492         0       3
## 493         493         0       1
## 494         494         0       1
## 495         495         0       3
## 496         496         0       3
## 497         497         1       1
## 498         498         0       3
## 499         499         0       1
## 500         500         0       3
## 501         501         0       3
## 502         502         0       3
## 503         503         0       3
## 504         504         0       3
## 505         505         1       1
## 506         506         0       1
## 507         507         1       2
## 508         508         1       1
## 509         509         0       3
## 510         510         1       3
## 511         511         1       3
## 512         512         0       3
## 513         513         1       1
## 514         514         1       1
## 515         515         0       3
## 516         516         0       1
## 517         517         1       2
## 518         518         0       3
## 519         519         1       2
## 520         520         0       3
## 521         521         1       1
## 522         522         0       3
## 523         523         0       3
## 524         524         1       1
## 525         525         0       3
## 526         526         0       3
## 527         527         1       2
## 528         528         0       1
## 529         529         0       3
## 530         530         0       2
## 531         531         1       2
## 532         532         0       3
## 533         533         0       3
## 534         534         1       3
## 535         535         0       3
## 536         536         1       2
## 537         537         0       1
## 538         538         1       1
## 539         539         0       3
## 540         540         1       1
## 541         541         1       1
## 542         542         0       3
## 543         543         0       3
## 544         544         1       2
```

```
## 545         545         0       1
## 546         546         0       1
## 547         547         1       2
## 548         548         1       2
## 549         549         0       3
## 550         550         1       2
## 551         551         1       1
## 552         552         0       2
## 553         553         0       3
## 554         554         1       3
## 555         555         1       3
## 556         556         0       1
## 557         557         1       1
## 558         558         0       1
## 559         559         1       1
## 560         560         1       3
## 561         561         0       3
## 562         562         0       3
## 563         563         0       2
## 564         564         0       3
## 565         565         0       3
## 566         566         0       3
## 567         567         0       3
## 568         568         0       3
## 569         569         0       3
## 570         570         1       3
## 571         571         1       2
## 572         572         1       1
## 573         573         1       1
## 574         574         1       3
## 575         575         0       3
## 576         576         0       3
## 577         577         1       2
## 578         578         1       1
## 579         579         0       3
## 580         580         1       3
## 581         581         1       2
## 582         582         1       1
## 583         583         0       2
## 584         584         0       1
## 585         585         0       3
## 586         586         1       1
## 587         587         0       2
## 588         588         1       1
## 589         589         0       3
## 590         590         0       3
## 591         591         0       3
## 592         592         1       1
## 593         593         0       3
## 594         594         0       3
## 595         595         0       2
## 596         596         0       3
## 597         597         1       2
## 598         598         0       3
```

```
## 599         599         0       3
## 600         600         1       1
## 601         601         1       2
## 602         602         0       3
## 603         603         0       1
## 604         604         0       3
## 605         605         1       1
## 606         606         0       3
## 607         607         0       3
## 608         608         1       1
## 609         609         1       2
## 610         610         1       1
## 611         611         0       3
## 612         612         0       3
## 613         613         1       3
## 614         614         0       3
## 615         615         0       3
## 616         616         1       2
## 617         617         0       3
## 618         618         0       3
## 619         619         1       2
## 620         620         0       2
## 621         621         0       3
## 622         622         1       1
## 623         623         1       3
## 624         624         0       3
## 625         625         0       3
## 626         626         0       1
## 627         627         0       2
## 628         628         1       1
## 629         629         0       3
## 630         630         0       3
## 631         631         1       1
## 632         632         0       3
## 633         633         1       1
## 634         634         0       1
## 635         635         0       3
## 636         636         1       2
## 637         637         0       3
## 638         638         0       2
## 639         639         0       3
## 640         640         0       3
## 641         641         0       3
## 642         642         1       1
## 643         643         0       3
## 644         644         1       3
## 645         645         1       3
## 646         646         1       1
## 647         647         0       3
## 648         648         1       1
## 649         649         0       3
## 650         650         1       3
## 651         651         0       3
## 652         652         1       2
```

```
## 653         653         0       3
## 654         654         1       3
## 655         655         0       3
## 656         656         0       2
## 657         657         0       3
## 658         658         0       3
## 659         659         0       2
## 660         660         0       1
## 661         661         1       1
## 662         662         0       3
## 663         663         0       1
## 664         664         0       3
## 665         665         1       3
## 666         666         0       2
## 667         667         0       2
## 668         668         0       3
## 669         669         0       3
## 670         670         1       1
## 671         671         1       2
## 672         672         0       1
## 673         673         0       2
## 674         674         1       2
## 675         675         0       2
## 676         676         0       3
## 677         677         0       3
## 678         678         1       3
## 679         679         0       3
## 680         680         1       1
## 681         681         0       3
## 682         682         1       1
## 683         683         0       3
## 684         684         0       3
## 685         685         0       2
## 686         686         0       2
## 687         687         0       3
## 688         688         0       3
## 689         689         0       3
## 690         690         1       1
## 691         691         1       1
## 692         692         1       3
## 693         693         1       3
## 694         694         0       3
## 695         695         0       1
## 696         696         0       2
## 697         697         0       3
## 698         698         1       3
## 699         699         0       1
## 700         700         0       3
## 701         701         1       1
## 702         702         1       1
## 703         703         0       3
## 704         704         0       3
## 705         705         0       3
## 706         706         0       2
```

```
## 707         707         1       2
## 708         708         1       1
## 709         709         1       1
## 710         710         1       3
## 711         711         1       1
## 712         712         0       1
## 713         713         1       1
## 714         714         0       3
## 715         715         0       2
## 716         716         0       3
## 717         717         1       1
## 718         718         1       2
## 719         719         0       3
## 720         720         0       3
## 721         721         1       2
## 722         722         0       3
## 723         723         0       2
## 724         724         0       2
## 725         725         1       1
## 726         726         0       3
## 727         727         1       2
## 728         728         1       3
## 729         729         0       2
## 730         730         0       3
## 731         731         1       1
## 732         732         0       3
## 733         733         0       2
## 734         734         0       2
## 735         735         0       2
## 736         736         0       3
## 737         737         0       3
## 738         738         1       1
## 739         739         0       3
## 740         740         0       3
## 741         741         1       1
## 742         742         0       1
## 743         743         1       1
## 744         744         0       3
## 745         745         1       3
## 746         746         0       1
## 747         747         0       3
## 748         748         1       2
## 749         749         0       1
## 750         750         0       3
## 751         751         1       2
## 752         752         1       3
## 753         753         0       3
## 754         754         0       3
## 755         755         1       2
## 756         756         1       2
## 757         757         0       3
## 758         758         0       2
## 759         759         0       3
## 760         760         1       1
```

```
## 761         761         0       3
## 762         762         0       3
## 763         763         1       3
## 764         764         1       1
## 765         765         0       3
## 766         766         1       1
## 767         767         0       1
## 768         768         0       3
## 769         769         0       3
## 770         770         0       3
## 771         771         0       3
## 772         772         0       3
## 773         773         0       2
## 774         774         0       3
## 775         775         1       2
## 776         776         0       3
## 777         777         0       3
## 778         778         1       3
## 779         779         0       3
## 780         780         1       1
## 781         781         1       3
## 782         782         1       1
## 783         783         0       1
## 784         784         0       3
## 785         785         0       3
## 786         786         0       3
## 787         787         1       3
## 788         788         0       3
## 789         789         1       3
## 790         790         0       1
## 791         791         0       3
## 792         792         0       2
## 793         793         0       3
## 794         794         0       1
## 795         795         0       3
## 796         796         0       2
## 797         797         1       1
## 798         798         1       3
## 799         799         0       3
## 800         800         0       3
## 801         801         0       2
## 802         802         1       2
## 803         803         1       1
## 804         804         1       3
## 805         805         1       3
## 806         806         0       3
## 807         807         0       1
## 808         808         0       3
## 809         809         0       2
## 810         810         1       1
## 811         811         0       3
## 812         812         0       3
## 813         813         0       2
## 814         814         0       3
```

```
## 815         815         0       3
## 816         816         0       1
## 817         817         0       3
## 818         818         0       2
## 819         819         0       3
## 820         820         0       3
## 821         821         1       1
## 822         822         1       3
## 823         823         0       1
## 824         824         1       3
## 825         825         0       3
## 826         826         0       3
## 827         827         0       3
## 828         828         1       2
## 829         829         1       3
## 830         830         1       1
## 831         831         1       3
## 832         832         1       2
## 833         833         0       3
## 834         834         0       3
## 835         835         0       3
## 836         836         1       1
## 837         837         0       3
## 838         838         0       3
## 839         839         1       3
## 840         840         1       1
## 841         841         0       3
## 842         842         0       2
## 843         843         1       1
## 844         844         0       3
## 845         845         0       3
## 846         846         0       3
## 847         847         0       3
## 848         848         0       3
## 849         849         0       2
## 850         850         1       1
## 851         851         0       3
## 852         852         0       3
## 853         853         0       3
## 854         854         1       1
## 855         855         0       2
## 856         856         1       3
## 857         857         1       1
## 858         858         1       1
## 859         859         1       3
## 860         860         0       3
## 861         861         0       3
## 862         862         0       2
## 863         863         1       1
## 864         864         0       3
## 865         865         0       2
## 866         866         1       2
## 867         867         1       2
## 868         868         0       1
```

```
## 869         869        0      3
## 870         870        1      3
## 871         871        0      3
## 872         872        1      1
## 873         873        0      1
## 874         874        0      3
## 875         875        1      2
## 876         876        1      3
## 877         877        0      3
## 878         878        0      3
## 879         879        0      3
## 880         880        1      1
## 881         881        1      2
## 882         882        0      3
## 883         883        0      3
## 884         884        0      2
## 885         885        0      3
## 886         886        0      3
## 887         887        0      2
## 888         888        1      1
## 889         889        0      3
## 890         890        1      1
## 891         891        0      3
##                                                                                 Name
## 1                                                                 Braund, Mr. Owen Harris
## 2                       Cumings, Mrs. John Bradley (Florence Briggs Thayer)
## 3                                                                  Heikkinen, Miss. Laina
## 4                            Futrelle, Mrs. Jacques Heath (Lily May Peel)
## 5                                                                Allen, Mr. William Henry
## 6                                                                        Moran, Mr. James
## 7                                                                 McCarthy, Mr. Timothy J
## 8                                                          Palsson, Master. Gosta Leonard
## 9                                  Johnson, Mrs. Oscar W (Elisabeth Vilhelmina Berg)
## 10                                                 Nasser, Mrs. Nicholas (Adele Achem)
## 11                                                     Sandstrom, Miss. Marguerite Rut
## 12                                                            Bonnell, Miss. Elizabeth
## 13                                                   Saundercock, Mr. William Henry
## 14                                                      Andersson, Mr. Anders Johan
## 15                                                Vestrom, Miss. Hulda Amanda Adolfina
## 16                                                    Hewlett, Mrs. (Mary D Kingcome)
## 17                                                                Rice, Master. Eugene
## 18                                                        Williams, Mr. Charles Eugene
## 19                                  Vander Planke, Mrs. Julius (Emelia Maria Vandemoortele)
## 20                                                         Masselmani, Mrs. Fatima
## 21                                                            Fynney, Mr. Joseph J
## 22                                                          Beesley, Mr. Lawrence
## 23                                                        McGowan, Miss. Anna "Annie"
## 24                                                       Sloper, Mr. William Thompson
## 25                                                       Palsson, Miss. Torborg Danira
## 26                                Asplund, Mrs. Carl Oscar (Selma Augusta Emilia Johansson)
## 27                                                                Emir, Mr. Farred Chehab
## 28                                                      Fortune, Mr. Charles Alexander
## 29                                                       O'Dwyer, Miss. Ellen "Nellie"
## 30                                                                Todoroff, Mr. Lalio
```

```
## 31                                                 Uruchurtu, Don. Manuel E
## 32                                Spencer, Mrs. William Augustus (Marie Eugenie)
## 33                                                 Glynn, Miss. Mary Agatha
## 34                                                    Wheadon, Mr. Edward H
## 35                                                  Meyer, Mr. Edgar Joseph
## 36                                               Holverson, Mr. Alexander Oskar
## 37                                                           Mamee, Mr. Hanna
## 38                                                 Cann, Mr. Ernest Charles
## 39                                             Vander Planke, Miss. Augusta Maria
## 40                                                   Nicola-Yarred, Miss. Jamila
## 41                                        Ahlin, Mrs. Johan (Johanna Persdotter Larsson)
## 42                      Turpin, Mrs. William John Robert (Dorothy Ann Wonnacott)
## 43                                                         Kraeff, Mr. Theodor
## 44                                        Laroche, Miss. Simonne Marie Anne Andree
## 45                                                 Devaney, Miss. Margaret Delia
## 46                                                      Rogers, Mr. William John
## 47                                                             Lennon, Mr. Denis
## 48                                                 O'Driscoll, Miss. Bridget
## 49                                                       Samaan, Mr. Youssef
## 50                                        Arnold-Franchi, Mrs. Josef (Josefine Franchi)
## 51                                                   Panula, Master. Juha Niilo
## 52                                                 Nosworthy, Mr. Richard Cater
## 53                                        Harper, Mrs. Henry Sleeper (Myna Haxtun)
## 54                                Faunthorpe, Mrs. Lizzie (Elizabeth Anne Wilkinson)
## 55                                              Ostby, Mr. Engelhart Cornelius
## 56                                                       Woolner, Mr. Hugh
## 57                                                       Rugg, Miss. Emily
## 58                                                      Novel, Mr. Mansouer
## 59                                                 West, Miss. Constance Mirium
## 60                                              Goodwin, Master. William Frederick
## 61                                                    Sirayanian, Mr. Orsen
## 62                                                      Icard, Miss. Amelie
## 63                                                 Harris, Mr. Henry Birkhardt
## 64                                                       Skoog, Master. Harald
## 65                                                      Stewart, Mr. Albert A
## 66                                                   Moubarek, Master. Gerios
## 67                                                 Nye, Mrs. (Elizabeth Ramell)
## 68                                                     Crease, Mr. Ernest James
## 69                                              Andersson, Miss. Erna Alexandra
## 70                                                          Kink, Mr. Vincenz
## 71                                                Jenkin, Mr. Stephen Curnow
## 72                                                 Goodwin, Miss. Lillian Amy
## 73                                                       Hood, Mr. Ambrose Jr
## 74                                                Chronopoulos, Mr. Apostolos
## 75                                                           Bing, Mr. Lee
## 76                                                 Moen, Mr. Sigurd Hansen
## 77                                                       Staneff, Mr. Ivan
## 78                                                   Moutal, Mr. Rahamin Haim
## 79                                               Caldwell, Master. Alden Gates
## 80                                                 Dowdell, Miss. Elizabeth
## 81                                                      Waelens, Mr. Achille
## 82                                               Sheerlinck, Mr. Jan Baptist
## 83                                              McDermott, Miss. Brigdet Delia
## 84                                                    Carrau, Mr. Francisco M
```

```
## 85                                                  Ilett, Miss. Bertha
## 86  Backstrom, Mrs. Karl Alfred (Maria Mathilda Gustafsson)
## 87                                                Ford, Mr. William Neal
## 88                                           Slocovski, Mr. Selman Francis
## 89                                              Fortune, Miss. Mabel Helen
## 90                                                  Celotti, Mr. Francesco
## 91                                                  Christmann, Mr. Emil
## 92                                              Andreasson, Mr. Paul Edvin
## 93                                             Chaffee, Mr. Herbert Fuller
## 94                                                 Dean, Mr. Bertram Frank
## 95                                                       Coxon, Mr. Daniel
## 96                                             Shorney, Mr. Charles Joseph
## 97                                               Goldschmidt, Mr. George B
## 98                                          Greenfield, Mr. William Bertram
## 99                                        Doling, Mrs. John T (Ada Julia Bone)
## 100                                                 Kantor, Mr. Sinai
## 101                                               Petranec, Miss. Matilda
## 102                                          Petroff, Mr. Pastcho ("Pentcho")
## 103                                                 White, Mr. Richard Frasar
## 104                                              Johansson, Mr. Gustaf Joel
## 105                                            Gustafsson, Mr. Anders Vilhelm
## 106                                                 Mionoff, Mr. Stoytcho
## 107                                          Salkjelsvik, Miss. Anna Kristine
## 108                                                 Moss, Mr. Albert Johan
## 109                                                       Rekic, Mr. Tido
## 110                                                 Moran, Miss. Bertha
## 111                                          Porter, Mr. Walter Chamberlain
## 112                                                 Zabour, Miss. Hileni
## 113                                                Barton, Mr. David John
## 114                                               Jussila, Miss. Katriina
## 115                                                 Attalah, Miss. Malake
## 116                                                 Pekoniemi, Mr. Edvard
## 117                                                  Connors, Mr. Patrick
## 118                                           Turpin, Mr. William John Robert
## 119                                                 Baxter, Mr. Quigg Edmond
## 120                                        Andersson, Miss. Ellis Anna Maria
## 121                                              Hickman, Mr. Stanley George
## 122                                               Moore, Mr. Leonard Charles
## 123                                                     Nasser, Mr. Nicholas
## 124                                                  Webber, Miss. Susan
## 125                                              White, Mr. Percival Wayland
## 126                                             Nicola-Yarred, Master. Elias
## 127                                                 McMahon, Mr. Martin
## 128                                               Madsen, Mr. Fridtjof Arne
## 129                                                  Peter, Miss. Anna
## 130                                                 Ekstrom, Mr. Johan
## 131                                                Drazenoic, Mr. Jozef
## 132                                           Coelho, Mr. Domingos Fernandeo
## 133                                 Robins, Mrs. Alexander A (Grace Charity Laury)
## 134                                  Weisz, Mrs. Leopold (Mathilde Francoise Pede)
## 135                                           Sobey, Mr. Samuel James Hayden
## 136                                                  Richard, Mr. Emile
## 137                                             Newsom, Miss. Helen Monypeny
## 138                                               Futrelle, Mr. Jacques Heath
```

```
## 139                                                 Osen, Mr. Olaf Elon
## 140                                                  Giglio, Mr. Victor
## 141                                       Boulos, Mrs. Joseph (Sultana)
## 142                                           Nysten, Miss. Anna Sofia
## 143                 Hakkarainen, Mrs. Pekka Pietari (Elin Matilda Dolck)
## 144                                                 Burke, Mr. Jeremiah
## 145                                       Andrew, Mr. Edgardo Samuel
## 146                                     Nicholls, Mr. Joseph Charles
## 147                       Andersson, Mr. August Edvard ("Wennerstrom")
## 148                                   Ford, Miss. Robina Maggie "Ruby"
## 149                       Navratil, Mr. Michel ("Louis M Hoffman")
## 150                                 Byles, Rev. Thomas Roussel Davids
## 151                                        Bateman, Rev. Robert James
## 152                                 Pears, Mrs. Thomas (Edith Wearne)
## 153                                                   Meo, Mr. Alfonzo
## 154                                 van Billiard, Mr. Austin Blyler
## 155                                           Olsen, Mr. Ole Martin
## 156                                      Williams, Mr. Charles Duane
## 157                                   Gilnagh, Miss. Katherine "Katie"
## 158                                                   Corn, Mr. Harry
## 159                                                Smiljanic, Mr. Mile
## 160                                       Sage, Master. Thomas Henry
## 161                                         Cribb, Mr. John Hatfield
## 162                 Watt, Mrs. James (Elizabeth "Bessie" Inglis Milne)
## 163                                       Bengtsson, Mr. John Viktor
## 164                                                    Calic, Mr. Jovo
## 165                                     Panula, Master. Eino Viljami
## 166                 Goldsmith, Master. Frank John William "Frankie"
## 167                          Chibnall, Mrs. (Edith Martha Bowerman)
## 168                 Skoog, Mrs. William (Anna Bernhardina Karlsson)
## 169                                          Baumann, Mr. John D
## 170                                                 Ling, Mr. Lee
## 171                                  Van der hoef, Mr. Wyckoff
## 172                                        Rice, Master. Arthur
## 173                                   Johnson, Miss. Eleanor Ileen
## 174                                      Sivola, Mr. Antti Wilhelm
## 175                                        Smith, Mr. James Clinch
## 176                                       Klasen, Mr. Klas Albin
## 177                                  Lefebre, Master. Henry Forbes
## 178                                      Isham, Miss. Ann Elizabeth
## 179                                                  Hale, Mr. Reginald
## 180                                                 Leonard, Mr. Lionel
## 181                                   Sage, Miss. Constance Gladys
## 182                                                  Pernot, Mr. Rene
## 183                          Asplund, Master. Clarence Gustaf Hugo
## 184                                        Becker, Master. Richard F
## 185                                 Kink-Heilmann, Miss. Luise Gretchen
## 186                                       Rood, Mr. Hugh Roscoe
## 187                 O'Brien, Mrs. Thomas (Johanna "Hannah" Godfrey)
## 188                   Romaine, Mr. Charles Hallace ("Mr C Rolmane")
## 189                                                  Bourke, Mr. John
## 190                                                 Turcin, Mr. Stjepan
## 191                                                 Pinsky, Mrs. (Rosa)
## 192                                                 Carbines, Mr. William
```

```
## 193                                Andersen-Jensen, Miss. Carla Christine Nielsine
## 194                                                    Navratil, Master. Michel M
## 195                                 Brown, Mrs. James Joseph (Margaret Tobin)
## 196                                                        Lurette, Miss. Elise
## 197                                                         Mernagh, Mr. Robert
## 198                                                 Olsen, Mr. Karl Siegwart Andreas
## 199                                                 Madigan, Miss. Margaret "Maggie"
## 200                                            Yrois, Miss. Henriette ("Mrs Harbeck")
## 201                                                 Vande Walle, Mr. Nestor Cyriel
## 202                                                         Sage, Mr. Frederick
## 203                                                    Johanson, Mr. Jakob Alfred
## 204                                                         Youseff, Mr. Gerious
## 205                                                      Cohen, Mr. Gurshon "Gus"
## 206                                                    Strom, Miss. Telma Matilda
## 207                                                    Backstrom, Mr. Karl Alfred
## 208                                                  Albimona, Mr. Nassef Cassem
## 209                                                    Carr, Miss. Helen "Ellen"
## 210                                                             Blank, Mr. Henry
## 211                                                               Ali, Mr. Ahmed
## 212                                                  Cameron, Miss. Clear Annie
## 213                                                       Perkin, Mr. John Henry
## 214                                                  Givard, Mr. Hans Kristensen
## 215                                                          Kiernan, Mr. Philip
## 216                                                     Newell, Miss. Madeleine
## 217                                                      Honkanen, Miss. Eliina
## 218                                                 Jacobsohn, Mr. Sidney Samuel
## 219                                                     Bazzani, Miss. Albina
## 220                                                        Harris, Mr. Walter
## 221                                                Sunderland, Mr. Victor Francis
## 222                                                         Bracken, Mr. James H
## 223                                                      Green, Mr. George Henry
## 224                                                         Nenkoff, Mr. Christo
## 225                                                   Hoyt, Mr. Frederick Maxfield
## 226                                                  Berglund, Mr. Karl Ivar Sven
## 227                                                     Mellors, Mr. William John
## 228                                                Lovell, Mr. John Hall ("Henry")
## 229                                                      Fahlstrom, Mr. Arne Jonas
## 230                                                        Lefebre, Miss. Mathilde
## 231                                  Harris, Mrs. Henry Birkhardt (Irene Wallach)
## 232                                                       Larsson, Mr. Bengt Edvin
## 233                                                     Sjostedt, Mr. Ernst Adolf
## 234                                                  Asplund, Miss. Lillian Gertrud
## 235                                                Leyson, Mr. Robert William Norman
## 236                                                    Harknett, Miss. Alice Phoebe
## 237                                                               Hold, Mr. Stephen
## 238                                                Collyer, Miss. Marjorie "Lottie"
## 239                                                  Pengelly, Mr. Frederick William
## 240                                                         Hunt, Mr. George Henry
## 241                                                          Zabour, Miss. Thamine
## 242                                                  Murphy, Miss. Katherine "Kate"
## 243                                                Coleridge, Mr. Reginald Charles
## 244                                                    Maenpaa, Mr. Matti Alexanteri
## 245                                                         Attalah, Mr. Sleiman
## 246                                                    Minahan, Dr. William Edward
```

```
## 247                                    Lindahl, Miss. Agda Thorilda Viktoria
## 248                                          Hamalainen, Mrs. William (Anna)
## 249                                            Beckwith, Mr. Richard Leonard
## 250                                            Carter, Rev. Ernest Courtenay
## 251                                                    Reed, Mr. James George
## 252                               Strom, Mrs. Wilhelm (Elna Matilda Persson)
## 253                                           Stead, Mr. William Thomas
## 254                                             Lobb, Mr. William Arthur
## 255                                 Rosblom, Mrs. Viktor (Helena Wilhelmina)
## 256                                  Touma, Mrs. Darwis (Hanne Youssef Razi)
## 257                                        Thorne, Mrs. Gertrude Maybelle
## 258                                                Cherry, Miss. Gladys
## 259                                                    Ward, Miss. Anna
## 260                                         Parrish, Mrs. (Lutie Davis)
## 261                                                  Smith, Mr. Thomas
## 262                                      Asplund, Master. Edvin Rojj Felix
## 263                                                  Taussig, Mr. Emil
## 264                                               Harrison, Mr. William
## 265                                                  Henry, Miss. Delia
## 266                                                  Reeves, Mr. David
## 267                                               Panula, Mr. Ernesti Arvid
## 268                                               Persson, Mr. Ernst Ulrik
## 269                           Graham, Mrs. William Thompson (Edith Junkins)
## 270                                               Bissette, Miss. Amelia
## 271                                                Cairns, Mr. Alexander
## 272                                            Tornquist, Mr. William Henry
## 273                              Mellinger, Mrs. (Elizabeth Anne Maidment)
## 274                                               Natsch, Mr. Charles H
## 275                                            Healy, Miss. Hanora "Nora"
## 276                                          Andrews, Miss. Kornelia Theodosia
## 277                                          Lindblom, Miss. Augusta Charlotta
## 278                                            Parkes, Mr. Francis "Frank"
## 279                                                    Rice, Master. Eric
## 280                                          Abbott, Mrs. Stanton (Rosa Hunt)
## 281                                                  Duane, Mr. Frank
## 282                                          Olsson, Mr. Nils Johan Goransson
## 283                                           de Pelsmaeker, Mr. Alfons
## 284                                          Dorking, Mr. Edward Arthur
## 285                                          Smith, Mr. Richard William
## 286                                                 Stankovic, Mr. Ivan
## 287                                             de Mulder, Mr. Theodore
## 288                                                Naidenoff, Mr. Penko
## 289                                                Hosono, Mr. Masabumi
## 290                                                Connolly, Miss. Kate
## 291                                          Barber, Miss. Ellen "Nellie"
## 292                                Bishop, Mrs. Dickinson H (Helen Walton)
## 293                                           Levy, Mr. Rene Jacques
## 294                                              Haas, Miss. Aloisia
## 295                                                 Mineff, Mr. Ivan
## 296                                               Lewy, Mr. Ervin G
## 297                                               Hanna, Mr. Mansour
## 298                                          Allison, Miss. Helen Loraine
## 299                                                 Saalfeld, Mr. Adolphe
## 300                        Baxter, Mrs. James (Helene DeLaudeniere Chaput)
```

```
## 301                                                 Kelly, Miss. Anna Katherine "Annie Kate"
## 302                                                                     McCoy, Mr. Bernard
## 303                                                   Johnson, Mr. William Cahoone Jr
## 304                                                               Keane, Miss. Nora A
## 305                                                 Williams, Mr. Howard Hugh "Harry"
## 306                                                    Allison, Master. Hudson Trevor
## 307                                                           Fleming, Miss. Margaret
## 308 Penasco y Castellana, Mrs. Victor de Satode (Maria Josefa Perez de Soto y Vallejo)
## 309                                                               Abelson, Mr. Samuel
## 310                                                  Francatelli, Miss. Laura Mabel
## 311                                                  Hays, Miss. Margaret Bechstein
## 312                                                      Ryerson, Miss. Emily Borie
## 313                                                Lahtinen, Mrs. William (Anna Sylfven)
## 314                                                           Hendekovic, Mr. Ignjac
## 315                                                               Hart, Mr. Benjamin
## 316                                                 Nilsson, Miss. Helmina Josefina
## 317                                                Kantor, Mrs. Sinai (Miriam Sternin)
## 318                                                             Moraweck, Dr. Ernest
## 319                                                          Wick, Miss. Mary Natalie
## 320                                 Spedden, Mrs. Frederic Oakley (Margaretta Corning Stone)
## 321                                                               Dennis, Mr. Samuel
## 322                                                                 Danoff, Mr. Yoto
## 323                                                        Slayter, Miss. Hilda Mary
## 324                                     Caldwell, Mrs. Albert Francis (Sylvia Mae Harbaugh)
## 325                                                          Sage, Mr. George John Jr
## 326                                                          Young, Miss. Marie Grice
## 327                                                       Nysveen, Mr. Johan Hansen
## 328                                                          Ball, Mrs. (Ada E Hall)
## 329                                          Goldsmith, Mrs. Frank John (Emily Alice Brown)
## 330                                                      Hippach, Miss. Jean Gertrude
## 331                                                               McCoy, Miss. Agnes
## 332                                                             Partner, Mr. Austen
## 333                                                       Graham, Mr. George Edward
## 334                                                    Vander Planke, Mr. Leo Edmondus
## 335                                       Frauenthal, Mrs. Henry William (Clara Heinsheimer)
## 336                                                               Denkoff, Mr. Mitto
## 337                                                      Pears, Mr. Thomas Clinton
## 338                                                   Burns, Miss. Elizabeth Margaret
## 339                                                            Dahl, Mr. Karl Edwart
## 340                                                  Blackwell, Mr. Stephen Weart
## 341                                                   Navratil, Master. Edmond Roger
## 342                                                   Fortune, Miss. Alice Elizabeth
## 343                                                      Collander, Mr. Erik Gustaf
## 344                                          Sedgwick, Mr. Charles Frederick Waddington
## 345                                                             Fox, Mr. Stanley Hubert
## 346                                                    Brown, Miss. Amelia "Mildred"
## 347                                                      Smith, Miss. Marion Elsie
## 348                                                Davison, Mrs. Thomas Henry (Mary E Finck)
## 349                                                  Coutts, Master. William Loch "William"
## 350                                                                   Dimic, Mr. Jovan
## 351                                                               Odahl, Mr. Nils Martin
## 352                                                  Williams-Lambert, Mr. Fletcher Fellows
## 353                                                                   Elias, Mr. Tannous
## 354                                                         Arnold-Franchi, Mr. Josef
```

```
## 355                                                 Yousif, Mr. Wazli
## 356                                             Vanden Steen, Mr. Leo Peter
## 357                                             Bowerman, Miss. Elsie Edith
## 358                                               Funk, Miss. Annie Clemmer
## 359                                                    McGovern, Miss. Mary
## 360                                          Mockler, Miss. Helen Mary "Ellie"
## 361                                                   Skoog, Mr. Wilhelm
## 362                                               del Carlo, Mr. Sebastiano
## 363                                            Barbara, Mrs. (Catherine David)
## 364                                                     Asim, Mr. Adola
## 365                                                  O'Brien, Mr. Thomas
## 366                                             Adahl, Mr. Mauritz Nils Martin
## 367                                 Warren, Mrs. Frank Manley (Anna Sophia Atkinson)
## 368                                               Moussa, Mrs. (Mantoura Boulos)
## 369                                                    Jermyn, Miss. Annie
## 370                                              Aubart, Mme. Leontine Pauline
## 371                                               Harder, Mr. George Achilles
## 372                                                Wiklund, Mr. Jakob Alfred
## 373                                              Beavan, Mr. William Thomas
## 374                                                    Ringhini, Mr. Sante
## 375                                                Palsson, Miss. Stina Viola
## 376                                          Meyer, Mrs. Edgar Joseph (Leila Saks)
## 377                                          Landergren, Miss. Aurora Adelia
## 378                                                Widener, Mr. Harry Elkins
## 379                                                    Betros, Mr. Tannous
## 380                                             Gustafsson, Mr. Karl Gideon
## 381                                                  Bidois, Miss. Rosalie
## 382                                             Nakid, Miss. Maria ("Mary")
## 383                                                     Tikkanen, Mr. Juho
## 384                          Holverson, Mrs. Alexander Oskar (Mary Aline Towner)
## 385                                                 Plotcharsky, Mr. Vasil
## 386                                               Davies, Mr. Charles Henry
## 387                                          Goodwin, Master. Sidney Leonard
## 388                                                      Buss, Miss. Kate
## 389                                                  Sadlier, Mr. Matthew
## 390                                                 Lehmann, Miss. Bertha
## 391                                               Carter, Mr. William Ernest
## 392                                                  Jansson, Mr. Carl Olof
## 393                                              Gustafsson, Mr. Johan Birger
## 394                                                    Newell, Miss. Marjorie
## 395                          Sandstrom, Mrs. Hjalmar (Agnes Charlotta Bengtsson)
## 396                                                  Johansson, Mr. Erik
## 397                                                  Olsson, Miss. Elina
## 398                                                McKane, Mr. Peter David
## 399                                                      Pain, Dr. Alfred
## 400                                           Trout, Mrs. William H (Jessie L)
## 401                                                   Niskanen, Mr. Juha
## 402                                                     Adams, Mr. John
## 403                                                 Jussila, Miss. Mari Aina
## 404                                               Hakkarainen, Mr. Pekka Pietari
## 405                                                 Oreskovic, Miss. Marija
## 406                                                      Gale, Mr. Shadrach
## 407                                           Widegren, Mr. Carl/Charles Peter
## 408                                             Richards, Master. William Rowe
```

```
## 409                                                 Birkeland, Mr. Hans Martin Monsen
## 410                                                             Lefebre, Miss. Ida
## 411                                                             Sdycoff, Mr. Todor
## 412                                                                Hart, Mr. Henry
## 413                                                          Minahan, Miss. Daisy E
## 414                                                 Cunningham, Mr. Alfred Fleming
## 415                                                       Sundman, Mr. Johan Julian
## 416                                           Meek, Mrs. Thomas (Annie Louise Rowley)
## 417                                 Drew, Mrs. James Vivian (Lulu Thorne Christian)
## 418                                                 Silven, Miss. Lyyli Karoliina
## 419                                                    Matthews, Mr. William John
## 420                                                  Van Impe, Miss. Catharina
## 421                                                     Gheorgheff, Mr. Stanio
## 422                                                        Charters, Mr. David
## 423                                                       Zimmerman, Mr. Leo
## 424                           Danbom, Mrs. Ernst Gilbert (Anna Sigrid Maria Brogren)
## 425                                                 Rosblom, Mr. Viktor Richard
## 426                                                      Wiseman, Mr. Phillippe
## 427                                   Clarke, Mrs. Charles V (Ada Maria Winfield)
## 428 Phillips, Miss. Kate Florence ("Mrs Kate Louise Phillips Marshall")
## 429                                                             Flynn, Mr. James
## 430                                           Pickard, Mr. Berk (Berk Trembisky)
## 431                                      Bjornstrom-Steffansson, Mr. Mauritz Hakan
## 432                                 Thorneycroft, Mrs. Percival (Florence Kate White)
## 433                               Louch, Mrs. Charles Alexander (Alice Adelaide Slow)
## 434                                                 Kallio, Mr. Nikolai Erland
## 435                                                  Silvey, Mr. William Baird
## 436                                                  Carter, Miss. Lucile Polk
## 437                                       Ford, Miss. Doolina Margaret "Daisy"
## 438                                       Richards, Mrs. Sidney (Emily Hocking)
## 439                                                        Fortune, Mr. Mark
## 440                                      Kvillner, Mr. Johan Henrik Johannesson
## 441                                   Hart, Mrs. Benjamin (Esther Ada Bloomfield)
## 442                                                          Hampe, Mr. Leon
## 443                                                  Petterson, Mr. Johan Emil
## 444                                                  Reynaldo, Ms. Encarnacion
## 445                                       Johannesen-Bratthammer, Mr. Bernt
## 446                                                  Dodge, Master. Washington
## 447                                       Mellinger, Miss. Madeleine Violet
## 448                                             Seward, Mr. Frederic Kimber
## 449                                        Baclini, Miss. Marie Catherine
## 450                                        Peuchen, Major. Arthur Godfrey
## 451                                                    West, Mr. Edwy Arthur
## 452                                      Hagland, Mr. Ingvald Olai Olsen
## 453                                      Foreman, Mr. Benjamin Laventall
## 454                                             Goldenberg, Mr. Samuel L
## 455                                                   Peduzzi, Mr. Joseph
## 456                                                    Jalsevac, Mr. Ivan
## 457                                                  Millet, Mr. Francis Davis
## 458                                       Kenyon, Mrs. Frederick R (Marion)
## 459                                                    Toomey, Miss. Ellen
## 460                                                  O'Connor, Mr. Maurice
## 461                                                    Anderson, Mr. Harry
## 462                                                    Morley, Mr. William
```

```
## 463                                                  Gee, Mr. Arthur H
## 464                                       Milling, Mr. Jacob Christian
## 465                                                Maisner, Mr. Simon
## 466                                  Goncalves, Mr. Manuel Estanslas
## 467                                             Campbell, Mr. William
## 468                                    Smart, Mr. John Montgomery
## 469                                             Scanlan, Mr. James
## 470                                  Baclini, Miss. Helene Barbara
## 471                                              Keefe, Mr. Arthur
## 472                                                Cacic, Mr. Luka
## 473                       West, Mrs. Edwy Arthur (Ada Mary Worth)
## 474                  Jerwan, Mrs. Amin S (Marie Marthe Thuillard)
## 475                                 Strandberg, Miss. Ida Sofia
## 476                                  Clifford, Mr. George Quincy
## 477                                      Renouf, Mr. Peter Henry
## 478                                    Braund, Mr. Lewis Richard
## 479                                    Karlsson, Mr. Nils August
## 480                                     Hirvonen, Miss. Hildur E
## 481                                  Goodwin, Master. Harold Victor
## 482                                Frost, Mr. Anthony Wood "Archie"
## 483                                      Rouse, Mr. Richard Henry
## 484                                       Turkula, Mrs. (Hedwig)
## 485                                     Bishop, Mr. Dickinson H
## 486                                     Lefebre, Miss. Jeannie
## 487                Hoyt, Mrs. Frederick Maxfield (Jane Anne Forby)
## 488                                        Kent, Mr. Edward Austin
## 489                                  Somerton, Mr. Francis William
## 490                           Coutts, Master. Eden Leslie "Neville"
## 491                            Hagland, Mr. Konrad Mathias Reiersen
## 492                                        Windelov, Mr. Einar
## 493                                  Molson, Mr. Harry Markland
## 494                                     Artagaveytia, Mr. Ramon
## 495                                  Stanley, Mr. Edward Roland
## 496                                        Youssef, Mr. Gerious
## 497                                 Eustis, Miss. Elizabeth Mussey
## 498                                Shellard, Mr. Frederick William
## 499                Allison, Mrs. Hudson J C (Bessie Waldo Daniels)
## 500                                        Svensson, Mr. Olof
## 501                                          Calic, Mr. Petar
## 502                                       Canavan, Miss. Mary
## 503                                 O'Sullivan, Miss. Bridget Mary
## 504                                 Laitinen, Miss. Kristina Sofia
## 505                                        Maioni, Miss. Roberta
## 506                  Penasco y Castellana, Mr. Victor de Satode
## 507                    Quick, Mrs. Frederick Charles (Jane Richards)
## 508                    Bradley, Mr. George ("George Arthur Brayton")
## 509                                  Olsen, Mr. Henry Margido
## 510                                           Lang, Mr. Fang
## 511                                  Daly, Mr. Eugene Patrick
## 512                                        Webber, Mr. James
## 513                                 McGough, Mr. James Robert
## 514                  Rothschild, Mrs. Martin (Elizabeth L. Barrett)
## 515                                        Coleff, Mr. Satio
## 516                                 Walker, Mr. William Anderson
```

```
## 517                                                 Lemore, Mrs. (Amelia Milley)
## 518                                                          Ryan, Mr. Patrick
## 519                          Angle, Mrs. William A (Florence "Mary" Agnes Hughes)
## 520                                                        Pavlovic, Mr. Stefo
## 521                                                    Perreault, Miss. Anne
## 522                                                          Vovk, Mr. Janko
## 523                                                       Lahoud, Mr. Sarkis
## 524                               Hippach, Mrs. Louis Albert (Ida Sophia Fischer)
## 525                                                        Kassem, Mr. Fared
## 526                                                       Farrell, Mr. James
## 527                                                     Ridsdale, Miss. Lucy
## 528                                                       Farthing, Mr. John
## 529                                                    Salonen, Mr. Johan Werner
## 530                                                  Hocking, Mr. Richard George
## 531                                                     Quick, Miss. Phyllis May
## 532                                                          Toufik, Mr. Nakli
## 533                                                     Elias, Mr. Joseph Jr
## 534                                          Peter, Mrs. Catherine (Catherine Rizk)
## 535                                                        Cacic, Miss. Marija
## 536                                                     Hart, Miss. Eva Miriam
## 537                                          Butt, Major. Archibald Willingham
## 538                                                       LeRoy, Miss. Bertha
## 539                                                   Risien, Mr. Samuel Beard
## 540                                              Frolicher, Miss. Hedwig Margaritha
## 541                                                     Crosby, Miss. Harriet R
## 542                                           Andersson, Miss. Ingeborg Constanzia
## 543                                              Andersson, Miss. Sigrid Elisabeth
## 544                                                          Beane, Mr. Edward
## 545                                                  Douglas, Mr. Walter Donald
## 546                                                Nicholson, Mr. Arthur Ernest
## 547                                           Beane, Mrs. Edward (Ethel Clarke)
## 548                                                  Padro y Manent, Mr. Julian
## 549                                                   Goldsmith, Mr. Frank John
## 550                                              Davies, Master. John Morgan Jr
## 551                                                 Thayer, Mr. John Borland Jr
## 552                                                 Sharp, Mr. Percival James R
## 553                                                         O'Brien, Mr. Timothy
## 554                                           Leeni, Mr. Fahim ("Philip Zenni")
## 555                                                          Ohman, Miss. Velin
## 556                                                        Wright, Mr. George
## 557                Duff Gordon, Lady. (Lucille Christiana Sutherland) ("Mrs Morgan")
## 558                                                        Robbins, Mr. Victor
## 559                                      Taussig, Mrs. Emil (Tillie Mandelbaum)
## 560                                 de Messemaeker, Mrs. Guillaume Joseph (Emma)
## 561                                                   Morrow, Mr. Thomas Rowan
## 562                                                          Sivic, Mr. Husein
## 563                                                 Norman, Mr. Robert Douglas
## 564                                                          Simmons, Mr. John
## 565                                              Meanwell, Miss. (Marion Ogden)
## 566                                                          Davies, Mr. Alfred J
## 567                                                        Stoytcheff, Mr. Ilia
## 568                                    Palsson, Mrs. Nils (Alma Cornelia Berglund)
## 569                                                          Doharr, Mr. Tannous
## 570                                                            Jonsson, Mr. Carl
```

```
## 571                                                 Harris, Mr. George
## 572                               Appleton, Mrs. Edward Dale (Charlotte Lamson)
## 573                                       Flynn, Mr. John Irwin ("Irving")
## 574                                                 Kelly, Miss. Mary
## 575                                          Rush, Mr. Alfred George John
## 576                                                 Patchett, Mr. George
## 577                                                 Garside, Miss. Ethel
## 578                                  Silvey, Mrs. William Baird (Alice Munger)
## 579                                         Caram, Mrs. Joseph (Maria Elias)
## 580                                                 Jussila, Mr. Eiriik
## 581                                              Christy, Miss. Julie Rachel
## 582                          Thayer, Mrs. John Borland (Marian Longstreth Morris)
## 583                                          Downton, Mr. William James
## 584                                                 Ross, Mr. John Hugo
## 585                                                 Paulner, Mr. Uscher
## 586                                                 Taussig, Miss. Ruth
## 587                                               Jarvis, Mr. John Denzil
## 588                                       Frolicher-Stehli, Mr. Maxmillian
## 589                                                 Gilinski, Mr. Eliezer
## 590                                                   Murdlin, Mr. Joseph
## 591                                                 Rintamaki, Mr. Matti
## 592                              Stephenson, Mrs. Walter Bertram (Martha Eustis)
## 593                                          Elsbury, Mr. William James
## 594                                                   Bourke, Miss. Mary
## 595                                               Chapman, Mr. John Henry
## 596                                          Van Impe, Mr. Jean Baptiste
## 597                                          Leitch, Miss. Jessie Wills
## 598                                                 Johnson, Mr. Alfred
## 599                                                   Boulos, Mr. Hanna
## 600                                  Duff Gordon, Sir. Cosmo Edmund ("Mr Morgan")
## 601                           Jacobsohn, Mrs. Sidney Samuel (Amy Frances Christy)
## 602                                                 Slabenoff, Mr. Petco
## 603                                          Harrington, Mr. Charles H
## 604                                          Torber, Mr. Ernst William
## 605                                        Homer, Mr. Harry ("Mr E Haven")
## 606                                          Lindell, Mr. Edvard Bengtsson
## 607                                                   Karaic, Mr. Milan
## 608                                        Daniel, Mr. Robert Williams
## 609                       Laroche, Mrs. Joseph (Juliette Marie Louise Lafargue)
## 610                                          Shutes, Miss. Elizabeth W
## 611                  Andersson, Mrs. Anders Johan (Alfrida Konstantia Brogren)
## 612                                                 Jardin, Mr. Jose Neto
## 613                                        Murphy, Miss. Margaret Jane
## 614                                                   Horgan, Mr. John
## 615                                       Brocklebank, Mr. William Alfred
## 616                                                 Herman, Miss. Alice
## 617                                          Danbom, Mr. Ernst Gilbert
## 618                               Lobb, Mrs. William Arthur (Cordelia K Stanlick)
## 619                                          Becker, Miss. Marion Louise
## 620                                                 Gavey, Mr. Lawrence
## 621                                                 Yasbeck, Mr. Antoni
## 622                                        Kimball, Mr. Edwin Nelson Jr
## 623                                                   Nakid, Mr. Sahid
## 624                                         Hansen, Mr. Henry Damsgaard
```

```
## 625                                                  Bowen, Mr. David John "Dai"
## 626                                                         Sutton, Mr. Frederick
## 627                                                Kirkland, Rev. Charles Leonard
## 628                                                Longley, Miss. Gretchen Fiske
## 629                                                    Bostandyeff, Mr. Guentcho
## 630                                                     O'Connell, Mr. Patrick D
## 631                                              Barkworth, Mr. Algernon Henry Wilson
## 632                                                  Lundahl, Mr. Johan Svensson
## 633                                                  Stahelin-Maeglin, Dr. Max
## 634                                                Parr, Mr. William Henry Marsh
## 635                                                         Skoog, Miss. Mabel
## 636                                                          Davis, Miss. Mary
## 637                                                  Leinonen, Mr. Antti Gustaf
## 638                                                         Collyer, Mr. Harvey
## 639                                           Panula, Mrs. Juha (Maria Emilia Ojala)
## 640                                                Thorneycroft, Mr. Percival
## 641                                                    Jensen, Mr. Hans Peder
## 642                                                     Sagesser, Mlle. Emma
## 643                                                Skoog, Miss. Margit Elizabeth
## 644                                                            Foo, Mr. Choong
## 645                                                         Baclini, Miss. Eugenie
## 646                                                  Harper, Mr. Henry Sleeper
## 647                                                           Cor, Mr. Liudevit
## 648                                            Simonius-Blumer, Col. Oberst Alfons
## 649                                                         Willey, Mr. Edward
## 650                                              Stanley, Miss. Amy Zillah Elsie
## 651                                                          Mitkoff, Mr. Mito
## 652                                                        Doling, Miss. Elsie
## 653                                                 Kalvik, Mr. Johannes Halvorsen
## 654                                                  O'Leary, Miss. Hanora "Norah"
## 655                                                  Hegarty, Miss. Hanora "Nora"
## 656                                                     Hickman, Mr. Leonard Mark
## 657                                                          Radeff, Mr. Alexander
## 658                                                 Bourke, Mrs. John (Catherine)
## 659                                                  Eitemiller, Mr. George Floyd
## 660                                                    Newell, Mr. Arthur Webster
## 661                                                 Frauenthal, Dr. Henry William
## 662                                                             Badt, Mr. Mohamed
## 663                                                Colley, Mr. Edward Pomeroy
## 664                                                           Coleff, Mr. Peju
## 665                                                  Lindqvist, Mr. Eino William
## 666                                                          Hickman, Mr. Lewis
## 667                                                  Butler, Mr. Reginald Fenton
## 668                                                  Rommetvedt, Mr. Knud Paust
## 669                                                           Cook, Mr. Jacob
## 670                                Taylor, Mrs. Elmer Zebley (Juliet Cummins Wright)
## 671                     Brown, Mrs. Thomas William Solomon (Elizabeth Catherine Ford)
## 672                                                      Davidson, Mr. Thornton
## 673                                                  Mitchell, Mr. Henry Michael
## 674                                                        Wilhelms, Mr. Charles
## 675                                                  Watson, Mr. Ennis Hastings
## 676                                                Edvardsson, Mr. Gustaf Hjalmar
## 677                                                 Sawyer, Mr. Frederick Charles
## 678                                                       Turja, Miss. Anna Sofia
```

```
## 679                                                 Goodwin, Mrs. Frederick (Augusta Tyler)
## 680                                                      Cardeza, Mr. Thomas Drake Martinez
## 681                                                                 Peters, Miss. Katie
## 682                                                                 Hassab, Mr. Hammad
## 683                                                              Olsvigen, Mr. Thor Anderson
## 684                                                            Goodwin, Mr. Charles Edward
## 685                                                          Brown, Mr. Thomas William Solomon
## 686                                                       Laroche, Mr. Joseph Philippe Lemercier
## 687                                                                 Panula, Mr. Jaako Arnold
## 688                                                                     Dakic, Mr. Branko
## 689                                                         Fischer, Mr. Eberhard Thelander
## 690                                                          Madill, Miss. Georgette Alexandra
## 691                                                                 Dick, Mr. Albert Adrian
## 692                                                                 Karun, Miss. Manca
## 693                                                                      Lam, Mr. Ali
## 694                                                                   Saad, Mr. Khalil
## 695                                                                    Weir, Col. John
## 696                                                              Chapman, Mr. Charles Henry
## 697                                                                   Kelly, Mr. James
## 698                                                          Mullens, Miss. Katherine "Katie"
## 699                                                                 Thayer, Mr. John Borland
## 700                                                 Humblen, Mr. Adolf Mathias Nicolai Olsen
## 701                                      Astor, Mrs. John Jacob (Madeleine Talmadge Force)
## 702                                                      Silverthorne, Mr. Spencer Victor
## 703                                                                 Barbara, Miss. Saiide
## 704                                                               Gallagher, Mr. Martin
## 705                                                               Hansen, Mr. Henrik Juul
## 706                                         Morley, Mr. Henry Samuel ("Mr Henry Marshall")
## 707                                                          Kelly, Mrs. Florence "Fannie"
## 708                                                        Calderhead, Mr. Edward Pennington
## 709                                                                  Cleaver, Miss. Alice
## 710                                      Moubarek, Master. Halim Gonios ("William George")
## 711                                       Mayne, Mlle. Berthe Antonine ("Mrs de Villiers")
## 712                                                                  Klaber, Mr. Herman
## 713                                                               Taylor, Mr. Elmer Zebley
## 714                                                             Larsson, Mr. August Viktor
## 715                                                                 Greenberg, Mr. Samuel
## 716                                            Soholt, Mr. Peter Andreas Lauritz Andersen
## 717                                                          Endres, Miss. Caroline Louise
## 718                                                    Troutt, Miss. Edwina Celia "Winnie"
## 719                                                                  McEvoy, Mr. Michael
## 720                                                           Johnson, Mr. Malkolm Joackim
## 721                                                        Harper, Miss. Annie Jessie "Nina"
## 722                                                                 Jensen, Mr. Svend Lauritz
## 723                                                               Gillespie, Mr. William Henry
## 724                                                                 Hodges, Mr. Henry Price
## 725                                                           Chambers, Mr. Norman Campbell
## 726                                                                  Oreskovic, Mr. Luka
## 727                                          Renouf, Mrs. Peter Henry (Lillian Jefferys)
## 728                                                                 Mannion, Miss. Margareth
## 729                                                            Bryhl, Mr. Kurt Arnold Gottfrid
## 730                                                              Ilmakangas, Miss. Pieta Sofia
## 731                                                              Allen, Miss. Elisabeth Walton
## 732                                                                 Hassan, Mr. Houssein G N
```

```
## 733                                                 Knight, Mr. Robert J
## 734                                               Berriman, Mr. William John
## 735                                             Troupiansky, Mr. Moses Aaron
## 736                                                     Williams, Mr. Leslie
## 737                                   Ford, Mrs. Edward (Margaret Ann Watson)
## 738                                                   Lesurer, Mr. Gustave J
## 739                                                      Ivanoff, Mr. Kanio
## 740                                                     Nankoff, Mr. Minko
## 741                                                   Hawksford, Mr. Walter James
## 742                                                 Cavendish, Mr. Tyrell William
## 743                                     Ryerson, Miss. Susan Parker "Suzette"
## 744                                                      McNamee, Mr. Neal
## 745                                                     Stranden, Mr. Juho
## 746                                                 Crosby, Capt. Edward Gifford
## 747                                                  Abbott, Mr. Rossmore Edward
## 748                                                        Sinkkonen, Miss. Anna
## 749                                                   Marvin, Mr. Daniel Warner
## 750                                                     Connaghton, Mr. Michael
## 751                                                           Wells, Miss. Joan
## 752                                                         Moor, Master. Meier
## 753                                               Vande Velde, Mr. Johannes Joseph
## 754                                                          Jonkoff, Mr. Lalio
## 755                                               Herman, Mrs. Samuel (Jane Laver)
## 756                                                      Hamalainen, Master. Viljo
## 757                                                  Carlsson, Mr. August Sigfrid
## 758                                                      Bailey, Mr. Percy Andrew
## 759                                                   Theobald, Mr. Thomas Leonard
## 760                 Rothes, the Countess. of (Lucy Noel Martha Dyer-Edwards)
## 761                                                       Garfirth, Mr. John
## 762                                                 Nirva, Mr. Iisakki Antino Aijo
## 763                                                       Barah, Mr. Hanna Assi
## 764                                   Carter, Mrs. William Ernest (Lucile Polk)
## 765                                                     Eklund, Mr. Hans Linus
## 766                                        Hogeboom, Mrs. John C (Anna Andrews)
## 767                                                  Brewe, Dr. Arthur Jackson
## 768                                                         Mangan, Miss. Mary
## 769                                                       Moran, Mr. Daniel J
## 770                                               Gronnestad, Mr. Daniel Danielsen
## 771                                                       Lievens, Mr. Rene Aime
## 772                                                     Jensen, Mr. Niels Peder
## 773                                                           Mack, Mrs. (Mary)
## 774                                                            Elias, Mr. Dibo
## 775                                           Hocking, Mrs. Elizabeth (Eliza Needs)
## 776                                         Myhrman, Mr. Pehr Fabian Oliver Malkolm
## 777                                                          Tobin, Mr. Roger
## 778                                                Emanuel, Miss. Virginia Ethel
## 779                                                     Kilgannon, Mr. Thomas J
## 780                       Robert, Mrs. Edward Scott (Elisabeth Walton McMillan)
## 781                                                         Ayoub, Miss. Banoura
## 782                                   Dick, Mrs. Albert Adrian (Vera Gillespie)
## 783                                                       Long, Mr. Milton Clyde
## 784                                                     Johnston, Mr. Andrew G
## 785                                                           Ali, Mr. William
## 786                                             Harmer, Mr. Abraham (David Lishin)
```

```
## 787                                                 Sjoblom, Miss. Anna Sofia
## 788                                                 Rice, Master. George Hugh
## 789                                                Dean, Master. Bertram Vere
## 790                                                  Guggenheim, Mr. Benjamin
## 791                                                  Keane, Mr. Andrew "Andy"
## 792                                                       Gaskell, Mr. Alfred
## 793                                                   Sage, Miss. Stella Anna
## 794                                                  Hoyt, Mr. William Fisher
## 795                                                     Dantcheff, Mr. Ristiu
## 796                                                        Otter, Mr. Richard
## 797                                                Leader, Dr. Alice (Farnham)
## 798                                                        Osman, Mrs. Mara
## 799                                               Ibrahim Shawah, Mr. Yousseff
## 800                    Van Impe, Mrs. Jean Baptiste (Rosalie Paula Govaert)
## 801                                                     Ponesell, Mr. Martin
## 802                            Collyer, Mrs. Harvey (Charlotte Annie Tate)
## 803                                    Carter, Master. William Thornton II
## 804                                        Thomas, Master. Assad Alexander
## 805                                                 Hedman, Mr. Oskar Arvid
## 806                                               Johansson, Mr. Karl Johan
## 807                                                 Andrews, Mr. Thomas Jr
## 808                                             Pettersson, Miss. Ellen Natalia
## 809                                                     Meyer, Mr. August
## 810                        Chambers, Mrs. Norman Campbell (Bertha Griggs)
## 811                                                  Alexander, Mr. William
## 812                                                       Lester, Mr. James
## 813                                                Slemen, Mr. Richard James
## 814                                             Andersson, Miss. Ebba Iris Alfrida
## 815                                                Tomlin, Mr. Ernest Portage
## 816                                                       Fry, Mr. Richard
## 817                                                Heininen, Miss. Wendla Maria
## 818                                                       Mallet, Mr. Albert
## 819                                              Holm, Mr. John Fredrik Alexander
## 820                                                 Skoog, Master. Karl Thorsten
## 821                      Hays, Mrs. Charles Melville (Clara Jennings Gregg)
## 822                                                       Lulic, Mr. Nikola
## 823                                              Reuchlin, Jonkheer. John George
## 824                                                    Moor, Mrs. (Beila)
## 825                                                Panula, Master. Urho Abraham
## 826                                                       Flynn, Mr. John
## 827                                                          Lam, Mr. Len
## 828                                                    Mallet, Master. Andre
## 829                                                McCormack, Mr. Thomas Joseph
## 830                                      Stone, Mrs. George Nelson (Martha Evelyn)
## 831                                        Yasbeck, Mrs. Antoni (Selini Alexander)
## 832                                                Richards, Master. George Sibley
## 833                                                        Saad, Mr. Amin
## 834                                                   Augustsson, Mr. Albert
## 835                                                   Allum, Mr. Owen George
## 836                                                Compton, Miss. Sara Rebecca
## 837                                                       Pasic, Mr. Jakob
## 838                                                    Sirota, Mr. Maurice
## 839                                                        Chip, Mr. Chang
## 840                                                  Marechal, Mr. Pierre
```

```
## 841                                                 Alhomaki, Mr. Ilmari Rudolf
## 842                                                    Mudd, Mr. Thomas Charles
## 843                                                      Serepeca, Miss. Augusta
## 844                                                  Lemberopolous, Mr. Peter L
## 845                                                         Culumovic, Mr. Jeso
## 846                                                         Abbing, Mr. Anthony
## 847                                                   Sage, Mr. Douglas Bullen
## 848                                                         Markoff, Mr. Marin
## 849                                                          Harper, Rev. John
## 850                                  Goldenberg, Mrs. Samuel L (Edwiga Grabowska)
## 851                                       Andersson, Master. Sigvard Harald Elias
## 852                                                       Svensson, Mr. Johan
## 853                                                     Boulos, Miss. Nourelain
## 854                                                   Lines, Miss. Mary Conover
## 855                                 Carter, Mrs. Ernest Courtenay (Lilian Hughes)
## 856                                                     Aks, Mrs. Sam (Leah Rosen)
## 857                                    Wick, Mrs. George Dennick (Mary Hitchcock)
## 858                                                      Daly, Mr. Peter Denis 
## 859                                           Baclini, Mrs. Solomon (Latifa Qurban)
## 860                                                            Razi, Mr. Raihed
## 861                                                     Hansen, Mr. Claus Peter
## 862                                                  Giles, Mr. Frederick Edward
## 863                          Swift, Mrs. Frederick Joel (Margaret Welles Barron)
## 864                                        Sage, Miss. Dorothy Edith "Dolly"
## 865                                                        Gill, Mr. John William
## 866                                                     Bystrom, Mrs. (Karolina)
## 867                                                 Duran y More, Miss. Asuncion
## 868                                               Roebling, Mr. Washington Augustus II
## 869                                                 van Melkebeke, Mr. Philemon
## 870                                              Johnson, Master. Harold Theodor
## 871                                                          Balkic, Mr. Cerin
## 872                                 Beckwith, Mrs. Richard Leonard (Sallie Monypeny)
## 873                                                     Carlsson, Mr. Frans Olof
## 874                                                  Vander Cruyssen, Mr. Victor
## 875                                               Abelson, Mrs. Samuel (Hannah Wizosky)
## 876                                            Najib, Miss. Adele Kiamie "Jane"
## 877                                               Gustafsson, Mr. Alfred Ossian
## 878                                                        Petroff, Mr. Nedelio
## 879                                                          Laleff, Mr. Kristo
## 880                                    Potter, Mrs. Thomas Jr (Lily Alexenia Wilson)
## 881                                     Shelley, Mrs. William (Imanita Parrish Hall)
## 882                                                          Markun, Mr. Johann
## 883                                                   Dahlberg, Miss. Gerda Ulrika
## 884                                                  Banfield, Mr. Frederick James
## 885                                                         Sutehall, Mr. Henry Jr
## 886                                                Rice, Mrs. William (Margaret Norton)
## 887                                                        Montvila, Rev. Juozas
## 888                                                  Graham, Miss. Margaret Edith
## 889                                       Johnston, Miss. Catherine Helen "Carrie"
## 890                                                          Behr, Mr. Karl Howell
## 891                                                            Dooley, Mr. Patrick
##        Sex   Age SibSp Parch            Ticket     Fare           Cabin
## 1     male 22.00     1     0         A/5 21171   7.2500               
## 2   female 38.00     1     0          PC 17599  71.2833             C85
```

```
## 3   female 26.00     0     0   STON/O2. 3101282   7.9250
## 4   female 35.00     1     0            113803  53.1000            C123
## 5     male 35.00     0     0            373450   8.0500
## 6     male    NA     0     0            330877   8.4583
## 7     male 54.00     0     0             17463  51.8625             E46
## 8     male  2.00     3     1            349909  21.0750
## 9   female 27.00     0     2            347742  11.1333
## 10  female 14.00     1     0            237736  30.0708
## 11  female  4.00     1     1          PP 9549  16.7000              G6
## 12  female 58.00     0     0            113783  26.5500            C103
## 13    male 20.00     0     0         A/5. 2151   8.0500
## 14    male 39.00     1     5            347082  31.2750
## 15  female 14.00     0     0            350406   7.8542
## 16  female 55.00     0     0            248706  16.0000
## 17    male  2.00     4     1            382652  29.1250
## 18    male    NA     0     0            244373  13.0000
## 19  female 31.00     1     0            345763  18.0000
## 20  female    NA     0     0              2649   7.2250
## 21    male 35.00     0     0            239865  26.0000
## 22    male 34.00     0     0            248698  13.0000             D56
## 23  female 15.00     0     0            330923   8.0292
## 24    male 28.00     0     0            113788  35.5000              A6
## 25  female  8.00     3     1            349909  21.0750
## 26  female 38.00     1     5            347077  31.3875
## 27    male    NA     0     0              2631   7.2250
## 28    male 19.00     3     2             19950 263.0000     C23 C25 C27
## 29  female    NA     0     0            330959   7.8792
## 30    male    NA     0     0            349216   7.8958
## 31    male 40.00     0     0          PC 17601  27.7208
## 32  female    NA     1     0          PC 17569 146.5208             B78
## 33  female    NA     0     0            335677   7.7500
## 34    male 66.00     0     0        C.A. 24579  10.5000
## 35    male 28.00     1     0          PC 17604  82.1708
## 36    male 42.00     1     0            113789  52.0000
## 37    male    NA     0     0              2677   7.2292
## 38    male 21.00     0     0        A./5. 2152   8.0500
## 39  female 18.00     2     0            345764  18.0000
## 40  female 14.00     1     0              2651  11.2417
## 41  female 40.00     1     0              7546   9.4750
## 42  female 27.00     1     0             11668  21.0000
## 43    male    NA     0     0            349253   7.8958
## 44  female  3.00     1     2     SC/Paris 2123  41.5792
## 45  female 19.00     0     0            330958   7.8792
## 46    male    NA     0     0    S.C./A.4. 23567   8.0500
## 47    male    NA     1     0            370371  15.5000
## 48  female    NA     0     0             14311   7.7500
## 49    male    NA     2     0              2662  21.6792
## 50  female 18.00     1     0            349237  17.8000
## 51    male  7.00     4     1           3101295  39.6875
## 52    male 21.00     0     0        A/4. 39886   7.8000
## 53  female 49.00     1     0          PC 17572  76.7292             D33
## 54  female 29.00     1     0              2926  26.0000
## 55    male 65.00     0     1            113509  61.9792             B30
## 56    male    NA     0     0             19947  35.5000             C52
```

```
## 57  female 21.00     0     0         C.A. 31026  10.5000
## 58    male 28.50     0     0               2697   7.2292
## 59  female  5.00     1     2         C.A. 34651  27.7500
## 60    male 11.00     5     2            CA 2144  46.9000
## 61    male 22.00     0     0               2669   7.2292
## 62  female 38.00     0     0             113572  80.0000            B28
## 63    male 45.00     1     0              36973  83.4750            C83
## 64    male  4.00     3     2             347088  27.9000
## 65    male    NA     0     0          PC 17605  27.7208
## 66    male    NA     1     1               2661  15.2458
## 67  female 29.00     0     0         C.A. 29395  10.5000            F33
## 68    male 19.00     0     0          S.P. 3464   8.1583
## 69  female 17.00     4     2            3101281   7.9250
## 70    male 26.00     2     0             315151   8.6625
## 71    male 32.00     0     0         C.A. 33111  10.5000
## 72  female 16.00     5     2            CA 2144  46.9000
## 73    male 21.00     0     0       S.O.C. 14879  73.5000
## 74    male 26.00     1     0               2680  14.4542
## 75    male 32.00     0     0               1601  56.4958
## 76    male 25.00     0     0             348123   7.6500          F G73
## 77    male    NA     0     0             349208   7.8958
## 78    male    NA     0     0             374746   8.0500
## 79    male  0.83     0     2             248738  29.0000
## 80  female 30.00     0     0             364516  12.4750
## 81    male 22.00     0     0             345767   9.0000
## 82    male 29.00     0     0             345779   9.5000
## 83  female    NA     0     0             330932   7.7875
## 84    male 28.00     0     0             113059  47.1000
## 85  female 17.00     0     0         SO/C 14885  10.5000
## 86  female 33.00     3     0            3101278  15.8500
## 87    male 16.00     1     3          W./C. 6608  34.3750
## 88    male    NA     0     0    SOTON/OQ 392086   8.0500
## 89  female 23.00     3     2              19950 263.0000    C23 C25 C27
## 90    male 24.00     0     0             343275   8.0500
## 91    male 29.00     0     0             343276   8.0500
## 92    male 20.00     0     0             347466   7.8542
## 93    male 46.00     1     0        W.E.P. 5734  61.1750            E31
## 94    male 26.00     1     2          C.A. 2315  20.5750
## 95    male 59.00     0     0             364500   7.2500
## 96    male    NA     0     0             374910   8.0500
## 97    male 71.00     0     0           PC 17754  34.6542             A5
## 98    male 23.00     0     1           PC 17759  63.3583        D10 D12
## 99  female 34.00     0     1             231919  23.0000
## 100   male 34.00     1     0             244367  26.0000
## 101 female 28.00     0     0             349245   7.8958
## 102   male    NA     0     0             349215   7.8958
## 103   male 21.00     0     1              35281  77.2875            D26
## 104   male 33.00     0     0               7540   8.6542
## 105   male 37.00     2     0            3101276   7.9250
## 106   male 28.00     0     0             349207   7.8958
## 107 female 21.00     0     0             343120   7.6500
## 108   male    NA     0     0             312991   7.7750
## 109   male 38.00     0     0             349249   7.8958
## 110 female    NA     1     0             371110  24.1500
```

```
## 111   male 47.00     0     0            110465  52.0000            C110
## 112 female 14.50     1     0              2665  14.4542
## 113   male 22.00     0     0            324669   8.0500
## 114 female 20.00     1     0              4136   9.8250
## 115 female 17.00     0     0              2627  14.4583
## 116   male 21.00     0     0  STON/O 2. 3101294   7.9250
## 117   male 70.50     0     0            370369   7.7500
## 118   male 29.00     1     0             11668  21.0000
## 119   male 24.00     0     1          PC 17558 247.5208         B58 B60
## 120 female  2.00     4     2            347082  31.2750
## 121   male 21.00     2     0       S.O.C. 14879  73.5000
## 122   male    NA     0     0          A4. 54510   8.0500
## 123   male 32.50     1     0            237736  30.0708
## 124 female 32.50     0     0             27267  13.0000            E101
## 125   male 54.00     0     1             35281  77.2875             D26
## 126   male 12.00     1     0              2651  11.2417
## 127   male    NA     0     0            370372   7.7500
## 128   male 24.00     0     0           C 17369   7.1417
## 129 female    NA     1     1              2668  22.3583           F E69
## 130   male 45.00     0     0            347061   6.9750
## 131   male 33.00     0     0            349241   7.8958
## 132   male 20.00     0     0 SOTON/O.Q. 3101307   7.0500
## 133 female 47.00     1     0          A/5. 3337  14.5000
## 134 female 29.00     1     0            228414  26.0000
## 135   male 25.00     0     0        C.A. 29178  13.0000
## 136   male 23.00     0     0     SC/PARIS 2133  15.0458
## 137 female 19.00     0     2             11752  26.2833             D47
## 138   male 37.00     1     0            113803  53.1000            C123
## 139   male 16.00     0     0              7534   9.2167
## 140   male 24.00     0     0          PC 17593  79.2000             B86
## 141 female    NA     0     2              2678  15.2458
## 142 female 22.00     0     0            347081   7.7500
## 143 female 24.00     1     0   STON/O2. 3101279  15.8500
## 144   male 19.00     0     0            365222   6.7500
## 145   male 18.00     0     0            231945  11.5000
## 146   male 19.00     1     1        C.A. 33112  36.7500
## 147   male 27.00     0     0            350043   7.7958
## 148 female  9.00     2     2        W./C. 6608  34.3750
## 149   male 36.50     0     2            230080  26.0000              F2
## 150   male 42.00     0     0            244310  13.0000
## 151   male 51.00     0     0       S.O.P. 1166  12.5250
## 152 female 22.00     1     0            113776  66.6000              C2
## 153   male 55.50     0     0         A.5. 11206   8.0500
## 154   male 40.50     0     2           A/5. 851  14.5000
## 155   male    NA     0     0          Fa 265302   7.3125
## 156   male 51.00     0     1          PC 17597  61.3792
## 157 female 16.00     0     0             35851   7.7333
## 158   male 30.00     0     0    SOTON/OQ 392090   8.0500
## 159   male    NA     0     0            315037   8.6625
## 160   male    NA     8     2           CA. 2343  69.5500
## 161   male 44.00     0     1            371362  16.1000
## 162 female 40.00     0     0        C.A. 33595  15.7500
## 163   male 26.00     0     0            347068   7.7750
## 164   male 17.00     0     0            315093   8.6625
```

```
## 165   male  1.00     4     1           3101295  39.6875
## 166   male  9.00     0     2            363291  20.5250
## 167 female    NA     0     1            113505  55.0000            E33
## 168 female 45.00     1     4            347088  27.9000
## 169   male    NA     0     0          PC 17318  25.9250
## 170   male 28.00     0     0              1601  56.4958
## 171   male 61.00     0     0            111240  33.5000            B19
## 172   male  4.00     4     1            382652  29.1250
## 173 female  1.00     1     1            347742  11.1333
## 174   male 21.00     0     0 STON/O 2. 3101280   7.9250
## 175   male 56.00     0     0             17764  30.6958             A7
## 176   male 18.00     1     1            350404   7.8542
## 177   male    NA     3     1              4133  25.4667
## 178 female 50.00     0     0          PC 17595  28.7125            C49
## 179   male 30.00     0     0            250653  13.0000
## 180   male 36.00     0     0              LINE   0.0000
## 181 female    NA     8     2          CA. 2343  69.5500
## 182   male    NA     0     0     SC/PARIS 2131  15.0500
## 183   male  9.00     4     2            347077  31.3875
## 184   male  1.00     2     1            230136  39.0000             F4
## 185 female  4.00     0     2            315153  22.0250
## 186   male    NA     0     0            113767  50.0000            A32
## 187 female    NA     1     0            370365  15.5000
## 188   male 45.00     0     0            111428  26.5500
## 189   male 40.00     1     1            364849  15.5000
## 190   male 36.00     0     0            349247   7.8958
## 191 female 32.00     0     0            234604  13.0000
## 192   male 19.00     0     0             28424  13.0000
## 193 female 19.00     1     0            350046   7.8542
## 194   male  3.00     1     1            230080  26.0000             F2
## 195 female 44.00     0     0          PC 17610  27.7208             B4
## 196 female 58.00     0     0          PC 17569 146.5208            B80
## 197   male    NA     0     0            368703   7.7500
## 198   male 42.00     0     1              4579   8.4042
## 199 female    NA     0     0            370370   7.7500
## 200 female 24.00     0     0            248747  13.0000
## 201   male 28.00     0     0            345770   9.5000
## 202   male    NA     8     2          CA. 2343  69.5500
## 203   male 34.00     0     0           3101264   6.4958
## 204   male 45.50     0     0              2628   7.2250
## 205   male 18.00     0     0          A/5 3540   8.0500
## 206 female  2.00     0     1            347054  10.4625             G6
## 207   male 32.00     1     0           3101278  15.8500
## 208   male 26.00     0     0              2699  18.7875
## 209 female 16.00     0     0            367231   7.7500
## 210   male 40.00     0     0            112277  31.0000            A31
## 211   male 24.00     0     0 SOTON/O.Q. 3101311   7.0500
## 212 female 35.00     0     0       F.C.C. 13528  21.0000
## 213   male 22.00     0     0          A/5 21174   7.2500
## 214   male 30.00     0     0            250646  13.0000
## 215   male    NA     1     0            367229   7.7500
## 216 female 31.00     1     0             35273 113.2750            D36
## 217 female 27.00     0     0   STON/O2. 3101283   7.9250
## 218   male 42.00     1     0            243847  27.0000
```

```
## 219 female 32.00     0     0             11813  76.2917            D15
## 220   male 30.00     0     0         W/C 14208  10.5000
## 221   male 16.00     0     0    SOTON/OQ 392089   8.0500
## 222   male 27.00     0     0            220367  13.0000
## 223   male 51.00     0     0             21440   8.0500
## 224   male    NA     0     0            349234   7.8958
## 225   male 38.00     1     0             19943  90.0000            C93
## 226   male 22.00     0     0           PP 4348   9.3500
## 227   male 19.00     0     0          SW/PP 751  10.5000
## 228   male 20.50     0     0          A/5 21173   7.2500
## 229   male 18.00     0     0            236171  13.0000
## 230 female    NA     3     1              4133  25.4667
## 231 female 35.00     1     0             36973  83.4750            C83
## 232   male 29.00     0     0            347067   7.7750
## 233   male 59.00     0     0            237442  13.5000
## 234 female  5.00     4     2            347077  31.3875
## 235   male 24.00     0     0         C.A. 29566  10.5000
## 236 female    NA     0     0         W./C. 6609   7.5500
## 237   male 44.00     1     0              26707  26.0000
## 238 female  8.00     0     2         C.A. 31921  26.2500
## 239   male 19.00     0     0             28665  10.5000
## 240   male 33.00     0     0         SCO/W 1585  12.2750
## 241 female    NA     1     0               2665  14.4542
## 242 female    NA     1     0             367230  15.5000
## 243   male 29.00     0     0        W./C. 14263  10.5000
## 244   male 22.00     0     0  STON/O 2. 3101275   7.1250
## 245   male 30.00     0     0               2694   7.2250
## 246   male 44.00     2     0             19928  90.0000            C78
## 247 female 25.00     0     0            347071   7.7750
## 248 female 24.00     0     2            250649  14.5000
## 249   male 37.00     1     1             11751  52.5542            D35
## 250   male 54.00     1     0            244252  26.0000
## 251   male    NA     0     0            362316   7.2500
## 252 female 29.00     1     1            347054  10.4625             G6
## 253   male 62.00     0     0            113514  26.5500            C87
## 254   male 30.00     1     0          A/5. 3336  16.1000
## 255 female 41.00     0     2            370129  20.2125
## 256 female 29.00     0     2              2650  15.2458
## 257 female    NA     0     0          PC 17585  79.2000
## 258 female 30.00     0     0            110152  86.5000            B77
## 259 female 35.00     0     0          PC 17755 512.3292
## 260 female 50.00     0     1            230433  26.0000
## 261   male    NA     0     0            384461   7.7500
## 262   male  3.00     4     2            347077  31.3875
## 263   male 52.00     1     1            110413  79.6500            E67
## 264   male 40.00     0     0            112059   0.0000            B94
## 265 female    NA     0     0            382649   7.7500
## 266   male 36.00     0     0         C.A. 17248  10.5000
## 267   male 16.00     4     1            3101295  39.6875
## 268   male 25.00     1     0            347083   7.7750
## 269 female 58.00     0     1          PC 17582 153.4625           C125
## 270 female 35.00     0     0          PC 17760 135.6333            C99
## 271   male    NA     0     0            113798  31.0000
## 272   male 25.00     0     0              LINE   0.0000
```

```
## 273 female 41.00     0     1            250644  19.5000                
## 274   male 37.00     0     1          PC 17596  29.7000            C118
## 275 female    NA     0     0            370375   7.7500                
## 276 female 63.00     1     0             13502  77.9583             D7
## 277 female 45.00     0     0            347073   7.7500                
## 278   male    NA     0     0            239853   0.0000                
## 279   male  7.00     4     1            382652  29.1250                
## 280 female 35.00     1     1         C.A. 2673  20.2500                
## 281   male 65.00     0     0            336439   7.7500                
## 282   male 28.00     0     0            347464   7.8542                
## 283   male 16.00     0     0            345778   9.5000                
## 284   male 19.00     0     0         A/5. 10482   8.0500                
## 285   male    NA     0     0             113056  26.0000            A19
## 286   male 33.00     0     0            349239   8.6625                
## 287   male 30.00     0     0            345774   9.5000                
## 288   male 22.00     0     0            349206   7.8958                
## 289   male 42.00     0     0            237798  13.0000                
## 290 female 22.00     0     0            370373   7.7500                
## 291 female 26.00     0     0             19877  78.8500                
## 292 female 19.00     1     0             11967  91.0792            B49
## 293   male 36.00     0     0      SC/Paris 2163  12.8750              D
## 294 female 24.00     0     0            349236   8.8500                
## 295   male 24.00     0     0            349233   7.8958                
## 296   male    NA     0     0          PC 17612  27.7208                
## 297   male 23.50     0     0              2693   7.2292                
## 298 female  2.00     1     2            113781 151.5500         C22 C26
## 299   male    NA     0     0             19988  30.5000            C106
## 300 female 50.00     0     1          PC 17558 247.5208         B58 B60
## 301 female    NA     0     0              9234   7.7500                
## 302   male    NA     2     0            367226  23.2500                
## 303   male 19.00     0     0              LINE   0.0000                
## 304 female    NA     0     0            226593  12.3500            E101
## 305   male    NA     0     0          A/5 2466   8.0500                
## 306   male  0.92     1     2            113781 151.5500         C22 C26
## 307 female    NA     0     0             17421 110.8833                
## 308 female 17.00     1     0          PC 17758 108.9000             C65
## 309   male 30.00     1     0         P/PP 3381  24.0000                
## 310 female 30.00     0     0          PC 17485  56.9292             E36
## 311 female 24.00     0     0             11767  83.1583             C54
## 312 female 18.00     2     2          PC 17608 262.3750 B57 B59 B63 B66
## 313 female 26.00     1     1            250651  26.0000                
## 314   male 28.00     0     0            349243   7.8958                
## 315   male 43.00     1     1       F.C.C. 13529  26.2500                
## 316 female 26.00     0     0            347470   7.8542                
## 317 female 24.00     1     0            244367  26.0000                
## 318   male 54.00     0     0             29011  14.0000                
## 319 female 31.00     0     2             36928 164.8667             C7
## 320 female 40.00     1     1             16966 134.5000             E34
## 321   male 22.00     0     0          A/5 21172   7.2500                
## 322   male 27.00     0     0            349219   7.8958                
## 323 female 30.00     0     0            234818  12.3500                
## 324 female 22.00     1     1            248738  29.0000                
## 325   male    NA     8     2          CA. 2343  69.5500                
## 326 female 36.00     0     0          PC 17760 135.6333             C32
```

```
## 327   male 61.00     0     0            345364   6.2375
## 328 female 36.00     0     0             28551  13.0000               D
## 329 female 31.00     1     1            363291  20.5250
## 330 female 16.00     0     1            111361  57.9792             B18
## 331 female    NA     2     0            367226  23.2500
## 332   male 45.50     0     0            113043  28.5000            C124
## 333   male 38.00     0     1          PC 17582 153.4625             C91
## 334   male 16.00     2     0            345764  18.0000
## 335 female    NA     1     0          PC 17611 133.6500
## 336   male    NA     0     0            349225   7.8958
## 337   male 29.00     1     0            113776  66.6000              C2
## 338 female 41.00     0     0             16966 134.5000             E40
## 339   male 45.00     0     0              7598   8.0500
## 340   male 45.00     0     0            113784  35.5000               T
## 341   male  2.00     1     1            230080  26.0000              F2
## 342 female 24.00     3     2             19950 263.0000     C23 C25 C27
## 343   male 28.00     0     0            248740  13.0000
## 344   male 25.00     0     0            244361  13.0000
## 345   male 36.00     0     0            229236  13.0000
## 346 female 24.00     0     0            248733  13.0000             F33
## 347 female 40.00     0     0             31418  13.0000
## 348 female    NA     1     0            386525  16.1000
## 349   male  3.00     1     1         C.A. 37671  15.9000
## 350   male 42.00     0     0            315088   8.6625
## 351   male 23.00     0     0              7267   9.2250
## 352   male    NA     0     0            113510  35.0000            C128
## 353   male 15.00     1     1              2695   7.2292
## 354   male 25.00     1     0            349237  17.8000
## 355   male    NA     0     0              2647   7.2250
## 356   male 28.00     0     0            345783   9.5000
## 357 female 22.00     0     1            113505  55.0000             E33
## 358 female 38.00     0     0            237671  13.0000
## 359 female    NA     0     0            330931   7.8792
## 360 female    NA     0     0            330980   7.8792
## 361   male 40.00     1     4            347088  27.9000
## 362   male 29.00     1     0      SC/PARIS 2167  27.7208
## 363 female 45.00     0     1              2691  14.4542
## 364   male 35.00     0     0 SOTON/O.Q. 3101310   7.0500
## 365   male    NA     1     0            370365  15.5000
## 366   male 30.00     0     0            C 7076   7.2500
## 367 female 60.00     1     0            110813  75.2500             D37
## 368 female    NA     0     0              2626   7.2292
## 369 female    NA     0     0             14313   7.7500
## 370 female 24.00     0     0          PC 17477  69.3000             B35
## 371   male 25.00     1     0             11765  55.4417             E50
## 372   male 18.00     1     0           3101267   6.4958
## 373   male 19.00     0     0            323951   8.0500
## 374   male 22.00     0     0          PC 17760 135.6333
## 375 female  3.00     3     1            349909  21.0750
## 376 female    NA     1     0          PC 17604  82.1708
## 377 female 22.00     0     0            C 7077   7.2500
## 378   male 27.00     0     2            113503 211.5000             C82
## 379   male 20.00     0     0              2648   4.0125
## 380   male 19.00     0     0            347069   7.7750
```

```
## 381 female 42.00     0     0           PC 17757 227.5250
## 382 female  1.00     0     2              2653  15.7417
## 383   male 32.00     0     0  STON/O 2. 3101293   7.9250
## 384 female 35.00     1     0            113789  52.0000
## 385   male    NA     0     0            349227   7.8958
## 386   male 18.00     0     0       S.O.C. 14879  73.5000
## 387   male  1.00     5     2            CA 2144  46.9000
## 388 female 36.00     0     0             27849  13.0000
## 389   male    NA     0     0            367655   7.7292
## 390 female 17.00     0     0            SC 1748  12.0000
## 391   male 36.00     1     2            113760 120.0000         B96 B98
## 392   male 21.00     0     0            350034   7.7958
## 393   male 28.00     2     0            3101277   7.9250
## 394 female 23.00     1     0             35273 113.2750             D36
## 395 female 24.00     0     2            PP 9549  16.7000              G6
## 396   male 22.00     0     0            350052   7.7958
## 397 female 31.00     0     0            350407   7.8542
## 398   male 46.00     0     0             28403  26.0000
## 399   male 23.00     0     0            244278  10.5000
## 400 female 28.00     0     0            240929  12.6500
## 401   male 39.00     0     0  STON/O 2. 3101289   7.9250
## 402   male 26.00     0     0            341826   8.0500
## 403 female 21.00     1     0              4137   9.8250
## 404   male 28.00     1     0   STON/O2. 3101279  15.8500
## 405 female 20.00     0     0            315096   8.6625
## 406   male 34.00     1     0             28664  21.0000
## 407   male 51.00     0     0            347064   7.7500
## 408   male  3.00     1     1             29106  18.7500
## 409   male 21.00     0     0            312992   7.7750
## 410 female    NA     3     1              4133  25.4667
## 411   male    NA     0     0            349222   7.8958
## 412   male    NA     0     0            394140   6.8583
## 413 female 33.00     1     0             19928  90.0000             C78
## 414   male    NA     0     0            239853   0.0000
## 415   male 44.00     0     0  STON/O 2. 3101269   7.9250
## 416 female    NA     0     0            343095   8.0500
## 417 female 34.00     1     1             28220  32.5000
## 418 female 18.00     0     2            250652  13.0000
## 419   male 30.00     0     0             28228  13.0000
## 420 female 10.00     0     2            345773  24.1500
## 421   male    NA     0     0            349254   7.8958
## 422   male 21.00     0     0         A/5. 13032   7.7333
## 423   male 29.00     0     0            315082   7.8750
## 424 female 28.00     1     1            347080  14.4000
## 425   male 18.00     1     1            370129  20.2125
## 426   male    NA     0     0         A/4. 34244   7.2500
## 427 female 28.00     1     0              2003  26.0000
## 428 female 19.00     0     0            250655  26.0000
## 429   male    NA     0     0            364851   7.7500
## 430   male 32.00     0     0  SOTON/O.Q. 392078   8.0500             E10
## 431   male 28.00     0     0            110564  26.5500             C52
## 432 female    NA     1     0            376564  16.1000
## 433 female 42.00     1     0         SC/AH 3085  26.0000
## 434   male 17.00     0     0  STON/O 2. 3101274   7.1250
```

```
## 435   male 50.00     1     0             13507  55.9000             E44
## 436 female 14.00     1     2            113760 120.0000         B96 B98
## 437 female 21.00     2     2         W./C. 6608  34.3750
## 438 female 24.00     2     3             29106  18.7500
## 439   male 64.00     1     4             19950 263.0000     C23 C25 C27
## 440   male 31.00     0     0          C.A. 18723  10.5000
## 441 female 45.00     1     1       F.C.C. 13529  26.2500
## 442   male 20.00     0     0            345769   9.5000
## 443   male 25.00     1     0            347076   7.7750
## 444 female 28.00     0     0            230434  13.0000
## 445   male    NA     0     0             65306   8.1125
## 446   male  4.00     0     2             33638  81.8583             A34
## 447 female 13.00     0     1            250644  19.5000
## 448   male 34.00     0     0            113794  26.5500
## 449 female  5.00     2     1              2666  19.2583
## 450   male 52.00     0     0            113786  30.5000            C104
## 451   male 36.00     1     2          C.A. 34651  27.7500
## 452   male    NA     1     0             65303  19.9667
## 453   male 30.00     0     0            113051  27.7500            C111
## 454   male 49.00     1     0             17453  89.1042             C92
## 455   male    NA     0     0           A/5 2817   8.0500
## 456   male 29.00     0     0            349240   7.8958
## 457   male 65.00     0     0             13509  26.5500             E38
## 458 female    NA     1     0             17464  51.8625             D21
## 459 female 50.00     0     0       F.C.C. 13531  10.5000
## 460   male    NA     0     0            371060   7.7500
## 461   male 48.00     0     0             19952  26.5500             E12
## 462   male 34.00     0     0            364506   8.0500
## 463   male 47.00     0     0            111320  38.5000             E63
## 464   male 48.00     0     0            234360  13.0000
## 465   male    NA     0     0           A/S 2816   8.0500
## 466   male 38.00     0     0 SOTON/O.Q. 3101306   7.0500
## 467   male    NA     0     0            239853   0.0000
## 468   male 56.00     0     0            113792  26.5500
## 469   male    NA     0     0             36209   7.7250
## 470 female  0.75     2     1              2666  19.2583
## 471   male    NA     0     0            323592   7.2500
## 472   male 38.00     0     0            315089   8.6625
## 473 female 33.00     1     2          C.A. 34651  27.7500
## 474 female 23.00     0     0    SC/AH Basle 541  13.7917               D
## 475 female 22.00     0     0              7553   9.8375
## 476   male    NA     0     0            110465  52.0000             A14
## 477   male 34.00     1     0             31027  21.0000
## 478   male 29.00     1     0              3460   7.0458
## 479   male 22.00     0     0            350060   7.5208
## 480 female  2.00     0     1           3101298  12.2875
## 481   male  9.00     5     2            CA 2144  46.9000
## 482   male    NA     0     0            239854   0.0000
## 483   male 50.00     0     0           A/5 3594   8.0500
## 484 female 63.00     0     0              4134   9.5875
## 485   male 25.00     1     0             11967  91.0792             B49
## 486 female    NA     3     1              4133  25.4667
## 487 female 35.00     1     0             19943  90.0000             C93
## 488   male 58.00     0     0             11771  29.7000             B37
```

```
## 489   male 30.00     0     0         A.5. 18509   8.0500
## 490   male  9.00     1     1         C.A. 37671  15.9000
## 491   male    NA     1     0              65304  19.9667
## 492   male 21.00     0     0   SOTON/OQ 3101317   7.2500
## 493   male 55.00     0     0             113787  30.5000            C30
## 494   male 71.00     0     0           PC 17609  49.5042
## 495   male 21.00     0     0          A/4 45380   8.0500
## 496   male    NA     0     0               2627  14.4583
## 497 female 54.00     1     0              36947  78.2667            D20
## 498   male    NA     0     0          C.A. 6212  15.1000
## 499 female 25.00     1     2             113781 151.5500        C22 C26
## 500   male 24.00     0     0             350035   7.7958
## 501   male 17.00     0     0             315086   8.6625
## 502 female 21.00     0     0             364846   7.7500
## 503 female    NA     0     0             330909   7.6292
## 504 female 37.00     0     0               4135   9.5875
## 505 female 16.00     0     0             110152  86.5000            B79
## 506   male 18.00     1     0           PC 17758 108.9000            C65
## 507 female 33.00     0     2              26360  26.0000
## 508   male    NA     0     0             111427  26.5500
## 509   male 28.00     0     0             C 4001  22.5250
## 510   male 26.00     0     0               1601  56.4958
## 511   male 29.00     0     0             382651   7.7500
## 512   male    NA     0     0   SOTON/OQ 3101316   8.0500
## 513   male 36.00     0     0           PC 17473  26.2875            E25
## 514 female 54.00     1     0           PC 17603  59.4000
## 515   male 24.00     0     0             349209   7.4958
## 516   male 47.00     0     0              36967  34.0208            D46
## 517 female 34.00     0     0         C.A. 34260  10.5000            F33
## 518   male    NA     0     0             371110  24.1500
## 519 female 36.00     1     0             226875  26.0000
## 520   male 32.00     0     0             349242   7.8958
## 521 female 30.00     0     0              12749  93.5000            B73
## 522   male 22.00     0     0             349252   7.8958
## 523   male    NA     0     0               2624   7.2250
## 524 female 44.00     0     1             111361  57.9792            B18
## 525   male    NA     0     0               2700   7.2292
## 526   male 40.50     0     0             367232   7.7500
## 527 female 50.00     0     0        W./C. 14258  10.5000
## 528   male    NA     0     0           PC 17483 221.7792            C95
## 529   male 39.00     0     0            3101296   7.9250
## 530   male 23.00     2     1              29104  11.5000
## 531 female  2.00     1     1              26360  26.0000
## 532   male    NA     0     0               2641   7.2292
## 533   male 17.00     1     1               2690   7.2292
## 534 female    NA     0     2               2668  22.3583
## 535 female 30.00     0     0             315084   8.6625
## 536 female  7.00     0     2       F.C.C. 13529  26.2500
## 537   male 45.00     0     0             113050  26.5500            B38
## 538 female 30.00     0     0           PC 17761 106.4250
## 539   male    NA     0     0             364498  14.5000
## 540 female 22.00     0     2              13568  49.5000            B39
## 541 female 36.00     0     2          WE/P 5735  71.0000            B22
## 542 female  9.00     4     2             347082  31.2750
```

```
## 543 female 11.00     4     2            347082  31.2750
## 544   male 32.00     1     0              2908  26.0000
## 545   male 50.00     1     0          PC 17761 106.4250            C86
## 546   male 64.00     0     0               693  26.0000
## 547 female 19.00     1     0              2908  26.0000
## 548   male    NA     0     0     SC/PARIS 2146  13.8625
## 549   male 33.00     1     1            363291  20.5250
## 550   male  8.00     1     1        C.A. 33112  36.7500
## 551   male 17.00     0     2             17421 110.8833            C70
## 552   male 27.00     0     0            244358  26.0000
## 553   male    NA     0     0            330979   7.8292
## 554   male 22.00     0     0              2620   7.2250
## 555 female 22.00     0     0            347085   7.7750
## 556   male 62.00     0     0            113807  26.5500
## 557 female 48.00     1     0             11755  39.6000            A16
## 558   male    NA     0     0          PC 17757 227.5250
## 559 female 39.00     1     1            110413  79.6500            E67
## 560 female 36.00     1     0            345572  17.4000
## 561   male    NA     0     0            372622   7.7500
## 562   male 40.00     0     0            349251   7.8958
## 563   male 28.00     0     0            218629  13.5000
## 564   male    NA     0     0   SOTON/OQ 392082   8.0500
## 565 female    NA     0     0 SOTON/O.Q. 392087   8.0500
## 566   male 24.00     2     0         A/4 48871  24.1500
## 567   male 19.00     0     0            349205   7.8958
## 568 female 29.00     0     4            349909  21.0750
## 569   male    NA     0     0              2686   7.2292
## 570   male 32.00     0     0            350417   7.8542
## 571   male 62.00     0     0       S.W./PP 752  10.5000
## 572 female 53.00     2     0             11769  51.4792            C101
## 573   male 36.00     0     0          PC 17474  26.3875            E25
## 574 female    NA     0     0             14312   7.7500
## 575   male 16.00     0     0        A/4. 20589   8.0500
## 576   male 19.00     0     0            358585  14.5000
## 577 female 34.00     0     0            243880  13.0000
## 578 female 39.00     1     0             13507  55.9000            E44
## 579 female    NA     1     0              2689  14.4583
## 580   male 32.00     0     0 STON/O 2. 3101286   7.9250
## 581 female 25.00     1     1            237789  30.0000
## 582 female 39.00     1     1             17421 110.8833            C68
## 583   male 54.00     0     0             28403  26.0000
## 584   male 36.00     0     0             13049  40.1250            A10
## 585   male    NA     0     0              3411   8.7125
## 586 female 18.00     0     2            110413  79.6500            E68
## 587   male 47.00     0     0            237565  15.0000
## 588   male 60.00     1     1             13567  79.2000            B41
## 589   male 22.00     0     0             14973   8.0500
## 590   male    NA     0     0        A./5. 3235   8.0500
## 591   male 35.00     0     0 STON/O 2. 3101273   7.1250
## 592 female 52.00     1     0             36947  78.2667            D20
## 593   male 47.00     0     0          A/5 3902   7.2500
## 594 female    NA     0     2            364848   7.7500
## 595   male 37.00     1     0       SC/AH 29037  26.0000
## 596   male 36.00     1     1            345773  24.1500
```

```
## 597 female    NA     0     0            248727  33.0000
## 598   male 49.00     0     0              LINE   0.0000
## 599   male    NA     0     0              2664   7.2250
## 600   male 49.00     1     0          PC 17485  56.9292            A20
## 601 female 24.00     2     1            243847  27.0000
## 602   male    NA     0     0            349214   7.8958
## 603   male    NA     0     0            113796  42.4000
## 604   male 44.00     0     0            364511   8.0500
## 605   male 35.00     0     0            111426  26.5500
## 606   male 36.00     1     0            349910  15.5500
## 607   male 30.00     0     0            349246   7.8958
## 608   male 27.00     0     0            113804  30.5000
## 609 female 22.00     1     2     SC/Paris 2123  41.5792
## 610 female 40.00     0     0          PC 17582 153.4625            C125
## 611 female 39.00     1     5            347082  31.2750
## 612   male    NA     0     0 SOTON/O.Q. 3101305   7.0500
## 613 female    NA     1     0            367230  15.5000
## 614   male    NA     0     0            370377   7.7500
## 615   male 35.00     0     0            364512   8.0500
## 616 female 24.00     1     2            220845  65.0000
## 617   male 34.00     1     1            347080  14.4000
## 618 female 26.00     1     0         A/5. 3336  16.1000
## 619 female  4.00     2     1            230136  39.0000             F4
## 620   male 26.00     0     0             31028  10.5000
## 621   male 27.00     1     0              2659  14.4542
## 622   male 42.00     1     0             11753  52.5542            D19
## 623   male 20.00     1     1              2653  15.7417
## 624   male 21.00     0     0            350029   7.8542
## 625   male 21.00     0     0             54636  16.1000
## 626   male 61.00     0     0             36963  32.3208            D50
## 627   male 57.00     0     0            219533  12.3500
## 628 female 21.00     0     0             13502  77.9583             D9
## 629   male 26.00     0     0            349224   7.8958
## 630   male    NA     0     0            334912   7.7333
## 631   male 80.00     0     0             27042  30.0000            A23
## 632   male 51.00     0     0            347743   7.0542
## 633   male 32.00     0     0             13214  30.5000            B50
## 634   male    NA     0     0            112052   0.0000
## 635 female  9.00     3     2            347088  27.9000
## 636 female 28.00     0     0            237668  13.0000
## 637   male 32.00     0     0 STON/O 2. 3101292   7.9250
## 638   male 31.00     1     1        C.A. 31921  26.2500
## 639 female 41.00     0     5           3101295  39.6875
## 640   male    NA     1     0            376564  16.1000
## 641   male 20.00     0     0            350050   7.8542
## 642 female 24.00     0     0          PC 17477  69.3000            B35
## 643 female  2.00     3     2            347088  27.9000
## 644   male    NA     0     0              1601  56.4958
## 645 female  0.75     2     1              2666  19.2583
## 646   male 48.00     1     0          PC 17572  76.7292            D33
## 647   male 19.00     0     0            349231   7.8958
## 648   male 56.00     0     0             13213  35.5000            A26
## 649   male    NA     0     0     S.O./P.P. 751   7.5500
## 650 female 23.00     0     0          CA. 2314   7.5500
```

```
## 651   male    NA     0     0            349221   7.8958
## 652 female 18.00     0     1            231919  23.0000
## 653   male 21.00     0     0              8475   8.4333
## 654 female    NA     0     0            330919   7.8292
## 655 female 18.00     0     0            365226   6.7500
## 656   male 24.00     2     0       S.O.C. 14879  73.5000
## 657   male    NA     0     0            349223   7.8958
## 658 female 32.00     1     1            364849  15.5000
## 659   male 23.00     0     0             29751  13.0000
## 660   male 58.00     0     2             35273 113.2750            D48
## 661   male 50.00     2     0          PC 17611 133.6500
## 662   male 40.00     0     0              2623   7.2250
## 663   male 47.00     0     0              5727  25.5875            E58
## 664   male 36.00     0     0            349210   7.4958
## 665   male 20.00     1     0  STON/O 2. 3101285   7.9250
## 666   male 32.00     2     0       S.O.C. 14879  73.5000
## 667   male 25.00     0     0            234686  13.0000
## 668   male    NA     0     0            312993   7.7750
## 669   male 43.00     0     0           A/5 3536   8.0500
## 670 female    NA     1     0             19996  52.0000           C126
## 671 female 40.00     1     1             29750  39.0000
## 672   male 31.00     1     0         F.C. 12750  52.0000            B71
## 673   male 70.00     0     0         C.A. 24580  10.5000
## 674   male 31.00     0     0            244270  13.0000
## 675   male    NA     0     0            239856   0.0000
## 676   male 18.00     0     0            349912   7.7750
## 677   male 24.50     0     0            342826   8.0500
## 678 female 18.00     0     0              4138   9.8417
## 679 female 43.00     1     6            CA 2144  46.9000
## 680   male 36.00     0     1           PC 17755 512.3292    B51 B53 B55
## 681 female    NA     0     0            330935   8.1375
## 682   male 27.00     0     0           PC 17572  76.7292            D49
## 683   male 20.00     0     0              6563   9.2250
## 684   male 14.00     5     2            CA 2144  46.9000
## 685   male 60.00     1     1             29750  39.0000
## 686   male 25.00     1     2      SC/Paris 2123  41.5792
## 687   male 14.00     4     1            3101295  39.6875
## 688   male 19.00     0     0            349228  10.1708
## 689   male 18.00     0     0            350036   7.7958
## 690 female 15.00     0     1             24160 211.3375             B5
## 691   male 31.00     1     0             17474  57.0000            B20
## 692 female  4.00     0     1            349256  13.4167
## 693   male    NA     0     0              1601  56.4958
## 694   male 25.00     0     0              2672   7.2250
## 695   male 60.00     0     0            113800  26.5500
## 696   male 52.00     0     0            248731  13.5000
## 697   male 44.00     0     0            363592   8.0500
## 698 female    NA     0     0             35852   7.7333
## 699   male 49.00     1     1             17421 110.8833            C68
## 700   male 42.00     0     0            348121   7.6500          F G63
## 701 female 18.00     1     0           PC 17757 227.5250        C62 C64
## 702   male 35.00     0     0           PC 17475  26.2875            E24
## 703 female 18.00     0     1              2691  14.4542
## 704   male 25.00     0     0             36864   7.7417
```

```
## 705   male 26.00     1     0            350025   7.8542
## 706   male 39.00     0     0            250655  26.0000
## 707 female 45.00     0     0            223596  13.5000
## 708   male 42.00     0     0          PC 17476  26.2875             E24
## 709 female 22.00     0     0            113781 151.5500
## 710   male    NA     1     1              2661  15.2458
## 711 female 24.00     0     0          PC 17482  49.5042             C90
## 712   male    NA     0     0            113028  26.5500            C124
## 713   male 48.00     1     0             19996  52.0000            C126
## 714   male 29.00     0     0              7545   9.4833
## 715   male 52.00     0     0            250647  13.0000
## 716   male 19.00     0     0            348124   7.6500           F G73
## 717 female 38.00     0     0          PC 17757 227.5250             C45
## 718 female 27.00     0     0             34218  10.5000            E101
## 719   male    NA     0     0             36568  15.5000
## 720   male 33.00     0     0            347062   7.7750
## 721 female  6.00     0     1            248727  33.0000
## 722   male 17.00     1     0            350048   7.0542
## 723   male 34.00     0     0             12233  13.0000
## 724   male 50.00     0     0            250643  13.0000
## 725   male 27.00     1     0            113806  53.1000              E8
## 726   male 20.00     0     0            315094   8.6625
## 727 female 30.00     3     0             31027  21.0000
## 728 female    NA     0     0             36866   7.7375
## 729   male 25.00     1     0            236853  26.0000
## 730 female 25.00     1     0   STON/O2. 3101271   7.9250
## 731 female 29.00     0     0             24160 211.3375              B5
## 732   male 11.00     0     0              2699  18.7875
## 733   male    NA     0     0            239855   0.0000
## 734   male 23.00     0     0             28425  13.0000
## 735   male 23.00     0     0            233639  13.0000
## 736   male 28.50     0     0             54636  16.1000
## 737 female 48.00     1     3         W./C. 6608  34.3750
## 738   male 35.00     0     0           PC 17755 512.3292            B101
## 739   male    NA     0     0            349201   7.8958
## 740   male    NA     0     0            349218   7.8958
## 741   male    NA     0     0             16988  30.0000             D45
## 742   male 36.00     1     0             19877  78.8500             C46
## 743 female 21.00     2     2          PC 17608 262.3750 B57 B59 B63 B66
## 744   male 24.00     1     0            376566  16.1000
## 745   male 31.00     0     0 STON/O 2. 3101288   7.9250
## 746   male 70.00     1     1          WE/P 5735  71.0000             B22
## 747   male 16.00     1     1          C.A. 2673  20.2500
## 748 female 30.00     0     0            250648  13.0000
## 749   male 19.00     1     0            113773  53.1000             D30
## 750   male 31.00     0     0            335097   7.7500
## 751 female  4.00     1     1             29103  23.0000
## 752   male  6.00     0     1            392096  12.4750            E121
## 753   male 33.00     0     0            345780   9.5000
## 754   male 23.00     0     0            349204   7.8958
## 755 female 48.00     1     2            220845  65.0000
## 756   male  0.67     1     1            250649  14.5000
## 757   male 28.00     0     0            350042   7.7958
## 758   male 18.00     0     0             29108  11.5000
```

```
## 759   male 34.00     0     0            363294   8.0500
## 760 female 33.00     0     0            110152  86.5000             B77
## 761   male    NA     0     0            358585  14.5000
## 762   male 41.00     0     0   SOTON/O2 3101272   7.1250
## 763   male 20.00     0     0              2663   7.2292
## 764 female 36.00     1     2            113760 120.0000         B96 B98
## 765   male 16.00     0     0            347074   7.7750
## 766 female 51.00     1     0             13502  77.9583             D11
## 767   male    NA     0     0            112379  39.6000
## 768 female 30.50     0     0            364850   7.7500
## 769   male    NA     1     0            371110  24.1500
## 770   male 32.00     0     0              8471   8.3625
## 771   male 24.00     0     0            345781   9.5000
## 772   male 48.00     0     0            350047   7.8542
## 773 female 57.00     0     0       S.O./P.P. 3  10.5000             E77
## 774   male    NA     0     0              2674   7.2250
## 775 female 54.00     1     3             29105  23.0000
## 776   male 18.00     0     0            347078   7.7500
## 777   male    NA     0     0            383121   7.7500             F38
## 778 female  5.00     0     0            364516  12.4750
## 779   male    NA     0     0             36865   7.7375
## 780 female 43.00     0     1             24160 211.3375              B3
## 781 female 13.00     0     0              2687   7.2292
## 782 female 17.00     1     0             17474  57.0000             B20
## 783   male 29.00     0     0            113501  30.0000              D6
## 784   male    NA     1     2        W./C. 6607  23.4500
## 785   male 25.00     0     0 SOTON/O.Q. 3101312   7.0500
## 786   male 25.00     0     0            374887   7.2500
## 787 female 18.00     0     0           3101265   7.4958
## 788   male  8.00     4     1            382652  29.1250
## 789   male  1.00     1     2         C.A. 2315  20.5750
## 790   male 46.00     0     0          PC 17593  79.2000         B82 B84
## 791   male    NA     0     0             12460   7.7500
## 792   male 16.00     0     0            239865  26.0000
## 793 female    NA     8     2          CA. 2343  69.5500
## 794   male    NA     0     0          PC 17600  30.6958
## 795   male 25.00     0     0            349203   7.8958
## 796   male 39.00     0     0             28213  13.0000
## 797 female 49.00     0     0             17465  25.9292             D17
## 798 female 31.00     0     0            349244   8.6833
## 799   male 30.00     0     0              2685   7.2292
## 800 female 30.00     1     1            345773  24.1500
## 801   male 34.00     0     0            250647  13.0000
## 802 female 31.00     1     1        C.A. 31921  26.2500
## 803   male 11.00     1     2            113760 120.0000         B96 B98
## 804   male  0.42     0     1              2625   8.5167
## 805   male 27.00     0     0            347089   6.9750
## 806   male 31.00     0     0            347063   7.7750
## 807   male 39.00     0     0            112050   0.0000             A36
## 808 female 18.00     0     0            347087   7.7750
## 809   male 39.00     0     0            248723  13.0000
## 810 female 33.00     1     0            113806  53.1000              E8
## 811   male 26.00     0     0              3474   7.8875
## 812   male 39.00     0     0         A/4 48871  24.1500
```

```
## 813   male 35.00     0     0             28206  10.5000
## 814 female  6.00     4     2            347082  31.2750
## 815   male 30.50     0     0            364499   8.0500
## 816   male    NA     0     0            112058   0.0000            B102
## 817 female 23.00     0     0  STON/O2. 3101290   7.9250
## 818   male 31.00     1     1   S.C./PARIS 2079  37.0042
## 819   male 43.00     0     0            C 7075   6.4500
## 820   male 10.00     3     2            347088  27.9000
## 821 female 52.00     1     1             12749  93.5000             B69
## 822   male 27.00     0     0            315098   8.6625
## 823   male 38.00     0     0             19972   0.0000
## 824 female 27.00     0     1            392096  12.4750            E121
## 825   male  2.00     4     1           3101295  39.6875
## 826   male    NA     0     0            368323   6.9500
## 827   male    NA     0     0              1601  56.4958
## 828   male  1.00     0     2   S.C./PARIS 2079  37.0042
## 829   male    NA     0     0            367228   7.7500
## 830 female 62.00     0     0            113572  80.0000             B28
## 831 female 15.00     1     0              2659  14.4542
## 832   male  0.83     1     1             29106  18.7500
## 833   male    NA     0     0              2671   7.2292
## 834   male 23.00     0     0            347468   7.8542
## 835   male 18.00     0     0              2223   8.3000
## 836 female 39.00     1     1          PC 17756  83.1583             E49
## 837   male 21.00     0     0            315097   8.6625
## 838   male    NA     0     0            392092   8.0500
## 839   male 32.00     0     0              1601  56.4958
## 840   male    NA     0     0             11774  29.7000             C47
## 841   male 20.00     0     0  SOTON/O2 3101287   7.9250
## 842   male 16.00     0     0       S.O./P.P. 3  10.5000
## 843 female 30.00     0     0            113798  31.0000
## 844   male 34.50     0     0              2683   6.4375
## 845   male 17.00     0     0            315090   8.6625
## 846   male 42.00     0     0         C.A. 5547   7.5500
## 847   male    NA     8     2          CA. 2343  69.5500
## 848   male 35.00     0     0            349213   7.8958
## 849   male 28.00     0     1            248727  33.0000
## 850 female    NA     1     0             17453  89.1042             C92
## 851   male  4.00     4     2            347082  31.2750
## 852   male 74.00     0     0            347060   7.7750
## 853 female  9.00     1     1              2678  15.2458
## 854 female 16.00     0     1          PC 17592  39.4000             D28
## 855 female 44.00     1     0            244252  26.0000
## 856 female 18.00     0     1            392091   9.3500
## 857 female 45.00     1     1             36928 164.8667
## 858   male 51.00     0     0            113055  26.5500             E17
## 859 female 24.00     0     3              2666  19.2583
## 860   male    NA     0     0              2629   7.2292
## 861   male 41.00     2     0            350026  14.1083
## 862   male 21.00     1     0             28134  11.5000
## 863 female 48.00     0     0             17466  25.9292             D17
## 864 female    NA     8     2          CA. 2343  69.5500
## 865   male 24.00     0     0            233866  13.0000
## 866 female 42.00     0     0            236852  13.0000
```

```
## 867 female 27.00     1     0      SC/PARIS 2149  13.8583
## 868   male 31.00     0     0           PC 17590  50.4958             A24
## 869   male    NA     0     0             345777   9.5000
## 870   male  4.00     1     1             347742  11.1333
## 871   male 26.00     0     0             349248   7.8958
## 872 female 47.00     1     1              11751  52.5542             D35
## 873   male 33.00     0     0                695   5.0000     B51 B53 B55
## 874   male 47.00     0     0             345765   9.0000
## 875 female 28.00     1     0          P/PP 3381  24.0000
## 876 female 15.00     0     0               2667   7.2250
## 877   male 20.00     0     0               7534   9.8458
## 878   male 19.00     0     0             349212   7.8958
## 879   male    NA     0     0             349217   7.8958
## 880 female 56.00     0     1              11767  83.1583             C50
## 881 female 25.00     0     1             230433  26.0000
## 882   male 33.00     0     0             349257   7.8958
## 883 female 22.00     0     0               7552  10.5167
## 884   male 28.00     0     0   C.A./SOTON 34068  10.5000
## 885   male 25.00     0     0    SOTON/OQ 392076   7.0500
## 886 female 39.00     0     5             382652  29.1250
## 887   male 27.00     0     0             211536  13.0000
## 888 female 19.00     0     0             112053  30.0000             B42
## 889 female    NA     1     2         W./C. 6607  23.4500
## 890   male 26.00     0     0             111369  30.0000            C148
## 891   male 32.00     0     0             370376   7.7500
##     Embarked
## 1          S
## 2          C
## 3          S
## 4          S
## 5          S
## 6          Q
## 7          S
## 8          S
## 9          S
## 10         C
## 11         S
## 12         S
## 13         S
## 14         S
## 15         S
## 16         S
## 17         Q
## 18         S
## 19         S
## 20         C
## 21         S
## 22         S
## 23         Q
## 24         S
## 25         S
## 26         S
## 27         C
## 28         S
```

```
## 29         Q
## 30         S
## 31         C
## 32         C
## 33         Q
## 34         S
## 35         C
## 36         S
## 37         C
## 38         S
## 39         S
## 40         C
## 41         S
## 42         S
## 43         C
## 44         C
## 45         Q
## 46         S
## 47         Q
## 48         Q
## 49         C
## 50         S
## 51         S
## 52         S
## 53         C
## 54         S
## 55         C
## 56         S
## 57         S
## 58         C
## 59         S
## 60         S
## 61         C
## 62
## 63         S
## 64         S
## 65         C
## 66         C
## 67         S
## 68         S
## 69         S
## 70         S
## 71         S
## 72         S
## 73         S
## 74         C
## 75         S
## 76         S
## 77         S
## 78         S
## 79         S
## 80         S
## 81         S
## 82         S
```

```
## 83        Q
## 84        S
## 85        S
## 86        S
## 87        S
## 88        S
## 89        S
## 90        S
## 91        S
## 92        S
## 93        S
## 94        S
## 95        S
## 96        S
## 97        C
## 98        C
## 99        S
## 100       S
## 101       S
## 102       S
## 103       S
## 104       S
## 105       S
## 106       S
## 107       S
## 108       S
## 109       S
## 110       Q
## 111       S
## 112       C
## 113       S
## 114       S
## 115       C
## 116       S
## 117       Q
## 118       S
## 119       C
## 120       S
## 121       S
## 122       S
## 123       C
## 124       S
## 125       S
## 126       C
## 127       Q
## 128       S
## 129       C
## 130       S
## 131       C
## 132       S
## 133       S
## 134       S
## 135       S
## 136       C
```

```
## 137        S
## 138        S
## 139        S
## 140        C
## 141        C
## 142        S
## 143        S
## 144        Q
## 145        S
## 146        S
## 147        S
## 148        S
## 149        S
## 150        S
## 151        S
## 152        S
## 153        S
## 154        S
## 155        S
## 156        C
## 157        Q
## 158        S
## 159        S
## 160        S
## 161        S
## 162        S
## 163        S
## 164        S
## 165        S
## 166        S
## 167        S
## 168        S
## 169        S
## 170        S
## 171        S
## 172        Q
## 173        S
## 174        S
## 175        C
## 176        S
## 177        S
## 178        C
## 179        S
## 180        S
## 181        S
## 182        C
## 183        S
## 184        S
## 185        S
## 186        S
## 187        Q
## 188        S
## 189        Q
## 190        S
```

```
## 191        S
## 192        S
## 193        S
## 194        S
## 195        C
## 196        C
## 197        Q
## 198        S
## 199        Q
## 200        S
## 201        S
## 202        S
## 203        S
## 204        C
## 205        S
## 206        S
## 207        S
## 208        C
## 209        Q
## 210        C
## 211        S
## 212        S
## 213        S
## 214        S
## 215        Q
## 216        C
## 217        S
## 218        S
## 219        C
## 220        S
## 221        S
## 222        S
## 223        S
## 224        S
## 225        S
## 226        S
## 227        S
## 228        S
## 229        S
## 230        S
## 231        S
## 232        S
## 233        S
## 234        S
## 235        S
## 236        S
## 237        S
## 238        S
## 239        S
## 240        S
## 241        C
## 242        Q
## 243        S
## 244        S
```

```
## 245        C
## 246        Q
## 247        S
## 248        S
## 249        S
## 250        S
## 251        S
## 252        S
## 253        S
## 254        S
## 255        S
## 256        C
## 257        C
## 258        S
## 259        C
## 260        S
## 261        Q
## 262        S
## 263        S
## 264        S
## 265        Q
## 266        S
## 267        S
## 268        S
## 269        S
## 270        S
## 271        S
## 272        S
## 273        S
## 274        C
## 275        Q
## 276        S
## 277        S
## 278        S
## 279        Q
## 280        S
## 281        Q
## 282        S
## 283        S
## 284        S
## 285        S
## 286        C
## 287        S
## 288        S
## 289        S
## 290        Q
## 291        S
## 292        C
## 293        C
## 294        S
## 295        S
## 296        C
## 297        C
## 298        S
```

```
## 299        S
## 300        C
## 301        Q
## 302        Q
## 303        S
## 304        Q
## 305        S
## 306        S
## 307        C
## 308        C
## 309        C
## 310        C
## 311        C
## 312        C
## 313        S
## 314        S
## 315        S
## 316        S
## 317        S
## 318        S
## 319        S
## 320        C
## 321        S
## 322        S
## 323        Q
## 324        S
## 325        S
## 326        C
## 327        S
## 328        S
## 329        S
## 330        C
## 331        Q
## 332        S
## 333        S
## 334        S
## 335        S
## 336        S
## 337        S
## 338        C
## 339        S
## 340        S
## 341        S
## 342        S
## 343        S
## 344        S
## 345        S
## 346        S
## 347        S
## 348        S
## 349        S
## 350        S
## 351        S
## 352        S
```

```
## 353        C
## 354        S
## 355        C
## 356        S
## 357        S
## 358        S
## 359        Q
## 360        Q
## 361        S
## 362        C
## 363        C
## 364        S
## 365        Q
## 366        S
## 367        C
## 368        C
## 369        Q
## 370        C
## 371        C
## 372        S
## 373        S
## 374        C
## 375        S
## 376        C
## 377        S
## 378        C
## 379        C
## 380        S
## 381        C
## 382        C
## 383        S
## 384        S
## 385        S
## 386        S
## 387        S
## 388        S
## 389        Q
## 390        C
## 391        S
## 392        S
## 393        S
## 394        C
## 395        S
## 396        S
## 397        S
## 398        S
## 399        S
## 400        S
## 401        S
## 402        S
## 403        S
## 404        S
## 405        S
## 406        S
```

```
## 407        S
## 408        S
## 409        S
## 410        S
## 411        S
## 412        Q
## 413        Q
## 414        S
## 415        S
## 416        S
## 417        S
## 418        S
## 419        S
## 420        S
## 421        C
## 422        Q
## 423        S
## 424        S
## 425        S
## 426        S
## 427        S
## 428        S
## 429        Q
## 430        S
## 431        S
## 432        S
## 433        S
## 434        S
## 435        S
## 436        S
## 437        S
## 438        S
## 439        S
## 440        S
## 441        S
## 442        S
## 443        S
## 444        S
## 445        S
## 446        S
## 447        S
## 448        S
## 449        C
## 450        S
## 451        S
## 452        S
## 453        C
## 454        C
## 455        S
## 456        C
## 457        S
## 458        S
## 459        S
## 460        Q
```

```
## 461        S
## 462        S
## 463        S
## 464        S
## 465        S
## 466        S
## 467        S
## 468        S
## 469        Q
## 470        C
## 471        S
## 472        S
## 473        S
## 474        C
## 475        S
## 476        S
## 477        S
## 478        S
## 479        S
## 480        S
## 481        S
## 482        S
## 483        S
## 484        S
## 485        C
## 486        S
## 487        S
## 488        C
## 489        S
## 490        S
## 491        S
## 492        S
## 493        S
## 494        C
## 495        S
## 496        C
## 497        C
## 498        S
## 499        S
## 500        S
## 501        S
## 502        Q
## 503        Q
## 504        S
## 505        S
## 506        C
## 507        S
## 508        S
## 509        S
## 510        S
## 511        Q
## 512        S
## 513        S
## 514        C
```

```
## 515        S
## 516        S
## 517        S
## 518        Q
## 519        S
## 520        S
## 521        S
## 522        S
## 523        C
## 524        C
## 525        C
## 526        Q
## 527        S
## 528        S
## 529        S
## 530        S
## 531        S
## 532        C
## 533        C
## 534        C
## 535        S
## 536        S
## 537        S
## 538        C
## 539        S
## 540        C
## 541        S
## 542        S
## 543        S
## 544        S
## 545        C
## 546        S
## 547        S
## 548        C
## 549        S
## 550        S
## 551        C
## 552        S
## 553        Q
## 554        C
## 555        S
## 556        S
## 557        C
## 558        C
## 559        S
## 560        S
## 561        Q
## 562        S
## 563        S
## 564        S
## 565        S
## 566        S
## 567        S
## 568        S
```

```
## 569        C
## 570        S
## 571        S
## 572        S
## 573        S
## 574        Q
## 575        S
## 576        S
## 577        S
## 578        S
## 579        C
## 580        S
## 581        S
## 582        C
## 583        S
## 584        C
## 585        C
## 586        S
## 587        S
## 588        C
## 589        S
## 590        S
## 591        S
## 592        C
## 593        S
## 594        Q
## 595        S
## 596        S
## 597        S
## 598        S
## 599        C
## 600        C
## 601        S
## 602        S
## 603        S
## 604        S
## 605        C
## 606        S
## 607        S
## 608        S
## 609        C
## 610        S
## 611        S
## 612        S
## 613        Q
## 614        Q
## 615        S
## 616        S
## 617        S
## 618        S
## 619        S
## 620        S
## 621        C
## 622        S
```

```
## 623        C
## 624        S
## 625        S
## 626        S
## 627        Q
## 628        S
## 629        S
## 630        Q
## 631        S
## 632        S
## 633        C
## 634        S
## 635        S
## 636        S
## 637        S
## 638        S
## 639        S
## 640        S
## 641        S
## 642        C
## 643        S
## 644        S
## 645        C
## 646        C
## 647        S
## 648        C
## 649        S
## 650        S
## 651        S
## 652        S
## 653        S
## 654        Q
## 655        Q
## 656        S
## 657        S
## 658        Q
## 659        S
## 660        C
## 661        S
## 662        C
## 663        S
## 664        S
## 665        S
## 666        S
## 667        S
## 668        S
## 669        S
## 670        S
## 671        S
## 672        S
## 673        S
## 674        S
## 675        S
## 676        S
```

```
## 677        S
## 678        S
## 679        S
## 680        C
## 681        Q
## 682        C
## 683        S
## 684        S
## 685        S
## 686        C
## 687        S
## 688        S
## 689        S
## 690        S
## 691        S
## 692        C
## 693        S
## 694        C
## 695        S
## 696        S
## 697        S
## 698        Q
## 699        C
## 700        S
## 701        C
## 702        S
## 703        C
## 704        Q
## 705        S
## 706        S
## 707        S
## 708        S
## 709        S
## 710        C
## 711        C
## 712        S
## 713        S
## 714        S
## 715        S
## 716        S
## 717        C
## 718        S
## 719        Q
## 720        S
## 721        S
## 722        S
## 723        S
## 724        S
## 725        S
## 726        S
## 727        S
## 728        Q
## 729        S
## 730        S
```

```
## 731        S
## 732        C
## 733        S
## 734        S
## 735        S
## 736        S
## 737        S
## 738        C
## 739        S
## 740        S
## 741        S
## 742        S
## 743        C
## 744        S
## 745        S
## 746        S
## 747        S
## 748        S
## 749        S
## 750        Q
## 751        S
## 752        S
## 753        S
## 754        S
## 755        S
## 756        S
## 757        S
## 758        S
## 759        S
## 760        S
## 761        S
## 762        S
## 763        C
## 764        S
## 765        S
## 766        S
## 767        C
## 768        Q
## 769        Q
## 770        S
## 771        S
## 772        S
## 773        S
## 774        C
## 775        S
## 776        S
## 777        Q
## 778        S
## 779        Q
## 780        S
## 781        C
## 782        S
## 783        S
## 784        S
```

```
## 785        S
## 786        S
## 787        S
## 788        Q
## 789        S
## 790        C
## 791        Q
## 792        S
## 793        S
## 794        C
## 795        S
## 796        S
## 797        S
## 798        S
## 799        C
## 800        S
## 801        S
## 802        S
## 803        S
## 804        C
## 805        S
## 806        S
## 807        S
## 808        S
## 809        S
## 810        S
## 811        S
## 812        S
## 813        S
## 814        S
## 815        S
## 816        S
## 817        S
## 818        C
## 819        S
## 820        S
## 821        S
## 822        S
## 823        S
## 824        S
## 825        S
## 826        Q
## 827        S
## 828        C
## 829        Q
## 830
## 831        C
## 832        S
## 833        C
## 834        S
## 835        S
## 836        C
## 837        S
## 838        S
```

```
## 839        S
## 840        C
## 841        S
## 842        S
## 843        C
## 844        C
## 845        S
## 846        S
## 847        S
## 848        C
## 849        S
## 850        C
## 851        S
## 852        S
## 853        C
## 854        S
## 855        S
## 856        S
## 857        S
## 858        S
## 859        C
## 860        C
## 861        S
## 862        S
## 863        S
## 864        S
## 865        S
## 866        S
## 867        C
## 868        S
## 869        S
## 870        S
## 871        S
## 872        S
## 873        S
## 874        S
## 875        C
## 876        C
## 877        S
## 878        S
## 879        S
## 880        C
## 881        S
## 882        S
## 883        S
## 884        S
## 885        S
## 886        Q
## 887        S
## 888        S
## 889        S
## 890        C
## 891        Q
```

```r
#Imputing missing age values with median of the age
data_3$Age[which(is.na(data_3$Age))] <- median(na.omit(data_3$Age))

#Splitting into Training and Test Data Set
partition <- createDataPartition(data_3$Survived, p = 0.8, list=FALSE)

Train <- data_3[partition,]
Test <- data_3[-partition,]

#The number of rows in training and test data
nrow(Train)
```

```
## [1] 714
```

```r
nrow(Test)
```

```
## [1] 177
```

Best Strategy for splitting Data Set

Divided the dataset with 80 for Training and 20 for Test. Having lesser rows in the Training data set will cause too less samples being used for training the data. Also by having a higher training data set we can train the model effeciently unless it results in overfitting. Mostly we fine tune our splitting ratio by determining which leads to a better accuracy. We can determine by 60-40, 70-30, 80-20 and determine which has better accuracy rates.

Problem 3

Question 2

```r
data_3$Sex <- as.factor(data_3$Sex)

# Logistic Regression Model
titanic_model <- glm(Survived ~ Pclass + Age + SibSp + Parch + Fare + Embarked +Sex,Train,family = bino
summary(titanic_model)
```

```
##
## Call:
## glm(formula = Survived ~ Pclass + Age + SibSp + Parch + Fare +
##     Embarked + Sex, family = binomial, data = Train)
##
## Deviance Residuals:
##     Min       1Q   Median       3Q      Max
## -2.3221  -0.5792  -0.4149   0.6072   2.4625
##
## Coefficients:
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept)  16.201997 535.411415   0.030   0.9759
## Pclass       -1.153088   0.162952  -7.076 1.48e-12 ***
## Age          -0.040770   0.008816  -4.624 3.76e-06 ***
```

```
## SibSp        -0.280644   0.117049  -2.398   0.0165 *
## Parch        -0.115945   0.129543  -0.895   0.3708
## Fare          0.000830   0.002729   0.304   0.7610
## EmbarkedC   -10.752183 535.411267  -0.020   0.9840
## EmbarkedQ   -10.792758 535.411344  -0.020   0.9839
## EmbarkedS   -11.016731 535.411249  -0.021   0.9836
## Sexmale      -2.880607   0.231745 -12.430  < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 950.86  on 713  degrees of freedom
## Residual deviance: 621.23  on 704  degrees of freedom
## AIC: 641.23
##
## Number of Fisher Scoring iterations: 12
```

```
#Backward stepwise elimination removing feature with highest p-value (Embarked)

titanic_model2 <- glm(Survived ~ Pclass + Age + SibSp + Sex + Parch + Fare , Train,  family = binomial)

# Removing Parch
titanic_model3 <- glm(Survived ~ Pclass + Age + SibSp + Sex + Fare, Train,  family = binomial)

# Removing Fare
titanic_model4 <- glm(Survived ~ Pclass + Age + SibSp + Sex, Train,  family = binomial)

summary(titanic_model4)
```

```
##
## Call:
## glm(formula = Survived ~ Pclass + Age + SibSp + Sex, family = binomial,
##     data = Train)
##
## Deviance Residuals:
##     Min       1Q   Median       3Q      Max
## -2.3917  -0.5965  -0.4064   0.6001   2.4461
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)  5.323440   0.542217   9.818  < 2e-16 ***
## Pclass      -1.188261   0.136495  -8.706  < 2e-16 ***
## Age         -0.040646   0.008754  -4.643 3.43e-06 ***
## SibSp       -0.317998   0.110807  -2.870  0.00411 **
## Sexmale     -2.869926   0.221866 -12.935  < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 950.86  on 713  degrees of freedom
## Residual deviance: 623.78  on 709  degrees of freedom
## AIC: 633.78
##
```

```
## Number of Fisher Scoring iterations: 5
```

```
#Predicting Survival of passenger
predicted <- predict(titanic_model4,Test)

# Checking the length of predicted and Test
length(predicted)
```

```
## [1] 177
```

```
length(Test$Survivedx)
```

```
## [1] 0
```

```
# Taking values above 0.5
result <- predicted > 0.5

Test$Survived <- as.integer(Test$Survived)
```

Problem 3

Question 3

P(Survived) = 1/(1 + e-(5.06 - 1.15*Pclass* - *0.04* Age - 0.36*SibSp* - *2.59*Sex))

Problem 3

Question 4

```
#Confusion Matrix
(table(ActualValue=Test$Survived, PredictedValue=result))
```

```
##            PredictedValue
## ActualValue FALSE TRUE
##           1    96   13
##           2    22   46
```

Accuracy is (108+38)/(108+1+30+38) = 82.4%

Problem 4

Knn for data imputation

This method the missing values of an instance are imputed considering a given number of instances that are most similar to the instance of interest. The similarity of two instances is determined using a distance function. For every observation to be imputed, it identifies 'k' closest observations based on the euclidean distane and computes the weighted average of these 'k' obs.

The advantage is that you could impute all the missing values in all variables with one call to the function. It takes the whole data frame as the argument and you don't even have to specify which variabe you want to impute. But we have to be cautious not to include the response variable while imputing, because, when imputing in test, if your data contains missing values, you won't be able to use the unknown response variable at that time.

The distance between the k nearest neighbours are calculated using euclidean distance, manhattan distance or hamming distance, which ever choosing the formula appropriatel.

The knn can predict both qualitative and quantitative attributes.

Naive Bayes for data imputation

Naive Bayesian Classifier for data imputation is known classifier for its good performance and also for its simple form. It is not sensitive to missing data and the efficiency of calculation is very high. The algorithms replace missing data in the first attribute defined in phase one, and then turn to the next attribute on the base of those attributes which have be filled in.

Naive Bayes is a simple and powerful technique which yields good results and fast.The atttributes are handled separately by the algorithm at both construction and prediction time.

It still consists of two phases :

a)Decide the order of the attribute to be treated according to some measurements such as information gain, missing rate, weighted index, etc.; b) Using the Naive Bayesian Classifier to estimate missing data. It is an iterative and repeating process. The algorithms replace missing data in the first attribute defined in phase one, and then turn to the next attribute on the base of those attributes which have be filled in. Generally, it is not necessary to replace all the missing data (usually 3~4 attributes) and the times for iterative can be reduced [7] This method is effortless to construct and no complex iterative argument estimation, that forms the specific functional for extremely big datasets. This classifier frequently executes especially strong and widely used because it continually execute further advanced classifying methods[11]. Figure 1 shows the structure of Naïve Bayesian Classifier approach.

Reference : 1. http://r-statistics.co/Missing-Value-Treatment-With-R.html 2. Naïve Bayes as an Imputation Tool for Classification Problems* Antonio J. T. Garcia1,2 & Eduardo R. Hruschka1 1Catholic University of Santos (UniSantos), Brazil.

Naive Bayes as an Imputation Tool for Classification Problems. (PDF Download Available). Available from: https://www.researchgate.net/publication/220980857_Naive_Bayes_as_an_Imputation_Tool_for_Classification_Problems [accessed Mar 20 2018].

3.http://www.ijircce.com/upload/2017/teccafe/39_IITC_048.pdf