

HomeWork_3

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#problem 1

```
#problem 1(A)

# Load the necessary library
library(rpart)

# Load the dataset
data <- read.csv("breast_cancer_updated.csv")

# Remove the IDNumber column
data <- data[,-1]

# Remove rows with NA values
data <- na.omit(data)
# Load the necessary library for cross-validation
library(caret)
```

```
## Loading required package: ggplot2
```

```
## Loading required package: lattice
```

```
# Set the seed for reproducibility
set.seed(123)

# Define the 10-fold cross-validation control
ctrl <- trainControl(method = "cv", number = 10)

# Train the decision tree using rpart with 10-fold cross-validation
model <- train(Class ~ ., data = data, method = "rpart", trControl = ctrl)

# Report the accuracy
accuracy <- model$results$Accuracy
print(paste("Mean Accuracy:", mean(accuracy)))
```

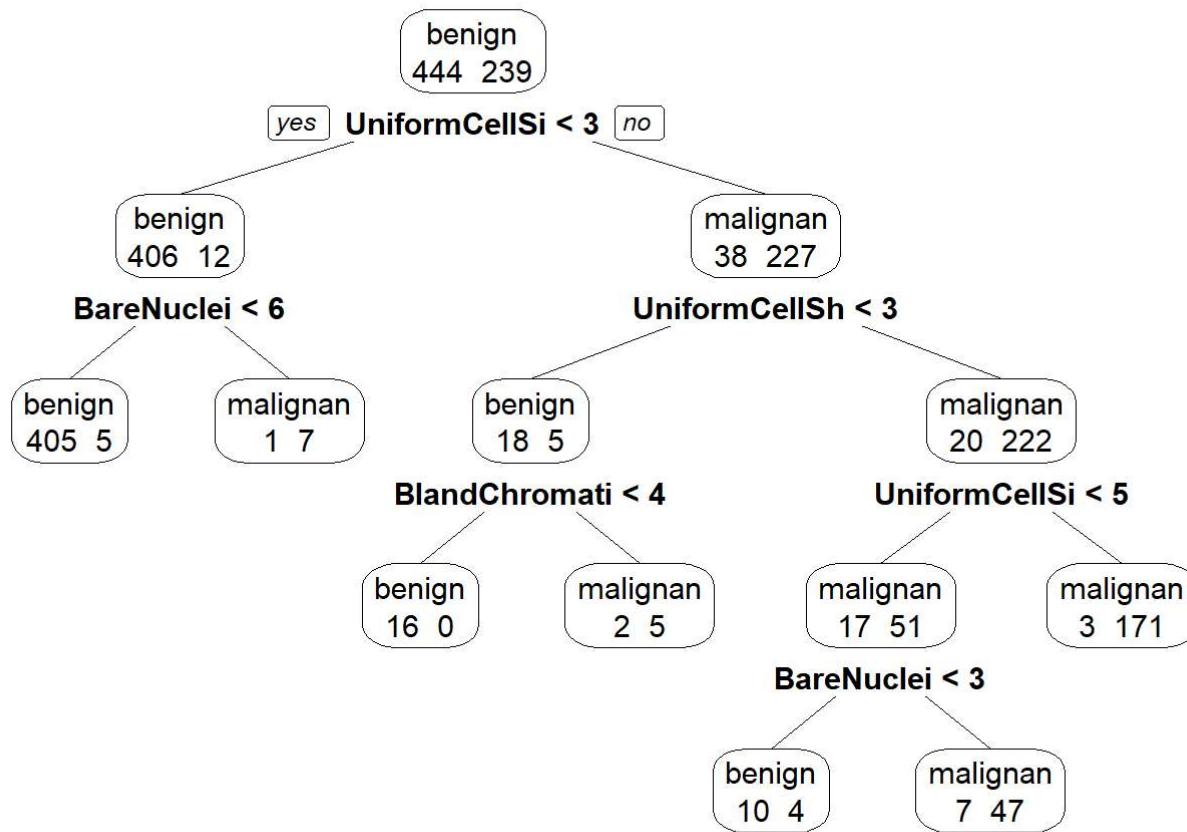
```
## [1] "Mean Accuracy: 0.908866155157715"
```

```
# Load the necessary library for plotting the decision tree
library(rpart.plot)

#problem 1(b)

# Create the decision tree
tree <- rpart(Class ~ ., data = data)

# Plot the decision tree
prp(tree, type = 2, extra = 1)
```



```
# Extract the decision tree rules
tree_rules <- as.character(tree$frame$yval)

#problem 1(c)
# Generate IF-THEN rules
for (i in 1:length(tree_rules)) {
  rule <- tree_rules[i]
  split <- as.character(tree$frame$var[i])
  if (!is.na(split) && split != "") {
    split_val <- as.character(tree$frame$yval[i])
    print(paste("IF", split, "THEN Class =", split_val))
  }
}
```

```
## [1] "IF UniformCellSize THEN Class = 1"
## [1] "IF BareNuclei THEN Class = 1"
## [1] "IF <leaf> THEN Class = 1"
## [1] "IF <leaf> THEN Class = 2"
## [1] "IF UniformCellShape THEN Class = 2"
## [1] "IF BlandChromatin THEN Class = 1"
## [1] "IF <leaf> THEN Class = 1"
## [1] "IF <leaf> THEN Class = 2"
## [1] "IF UniformCellSize THEN Class = 2"
## [1] "IF BareNuclei THEN Class = 2"
## [1] "IF <leaf> THEN Class = 1"
## [1] "IF <leaf> THEN Class = 2"
## [1] "IF <leaf> THEN Class = 2"
```

#problem 2(A) #Loaded libraries rpart and caret and trained the data set with the given

```
library(dplyr)
```

```
##  
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':  
##  
##     filter, lag
```

```
## The following objects are masked from 'package:base':  
##  
##     intersect, setdiff, setequal, union
```

```
data("storms")
```

```
# Make sure the 'category' variable is a factor
storms$category <- as.factor(storms$category)
library(rpart)
library(caret)
set.seed(94)
train_control = trainControl(method = "cv", number = 10)
# Make sure the 'category' variable is a factor
storms$category <- as.factor(storms$category)
storms <- na.omit(storms)
storms
```

```
## # A tibble: 2,051 × 13
##   name  year month  day hour  lat  long status category  wind pressure
##   <chr> <dbl> <dbl> <int> <dbl> <dbl> <dbl> <fct>   <fct>   <int>   <int>
## 1 Alex   2004     8     3     6   33 -77.4 hurricane 1        70    983
## 2 Alex   2004     8     3    12   34.2 -76.4 hurricane 2        85    974
## 3 Alex   2004     8     3    18   35.3 -75.2 hurricane 2        85    972
## 4 Alex   2004     8     4     0   36 -73.7 hurricane 1        80    974
## 5 Alex   2004     8     4     6   36.8 -72.1 hurricane 1        80    973
## 6 Alex   2004     8     4    12   37.3 -70.2 hurricane 2        85    973
## 7 Alex   2004     8     4    18   37.8 -68.3 hurricane 2        95    965
## 8 Alex   2004     8     5     0   38.5 -66   hurricane 3       105    957
## 9 Alex   2004     8     5     6   39.5 -63.1 hurricane 3       105    957
## 10 Alex  2004     8     5    12   40.8 -59.6 hurricane 3      100    962
## # i 2,041 more rows
## # i 2 more variables: tropicalstorm_force_diameter <int>,
## #   hurricane_force_diameter <int>
```

```
# Fit the model
tree1 <- train(category ~., data = storms, method = "rpart1SE", trControl = train_control)
tree1
```

```
## CART
##
## 2051 samples
## 12 predictor
## 5 classes: '1', '2', '3', '4', '5'
##
## No pre-processing
## Resampling: Cross-Validated (10 fold)
## Summary of sample sizes: 1847, 1847, 1844, 1845, 1845, 1846, ...
## Resampling results:
##
##   Accuracy Kappa
## 1         1
```

```
pred_tree <- predict(tree1, storms)
# Confusion Matrix
confusionMatrix(storms$category, pred_tree)
```

```

## Confusion Matrix and Statistics
##
##             Reference
## Prediction    1     2     3     4     5
##           1 1013     0     0     0     0
##           2     0 414     0     0     0
##           3     0     0 277     0     0
##           4     0     0     0 283     0
##           5     0     0     0     0   64
##
## Overall Statistics
##
##                 Accuracy : 1
##                 95% CI : (0.9982, 1)
## No Information Rate : 0.4939
## P-Value [Acc > NIR] : < 2.2e-16
##
##                 Kappa : 1
##
## McNemar's Test P-Value : NA
##
## Statistics by Class:
##
##                                Class: 1 Class: 2 Class: 3 Class: 4 Class: 5
## Sensitivity              1.0000  1.0000  1.0000  1.000  1.0000
## Specificity               1.000  1.0000  1.0000  1.000  1.0000
## Pos Pred Value            1.000  1.0000  1.0000  1.000  1.0000
## Neg Pred Value            1.000  1.0000  1.0000  1.000  1.0000
## Prevalence                0.4939  0.2019  0.1351  0.138  0.0312
## Detection Rate            0.4939  0.2019  0.1351  0.138  0.0312
## Detection Prevalence      0.4939  0.2019  0.1351  0.138  0.0312
## Balanced Accuracy          1.000  1.0000  1.0000  1.000  1.0000

```

```

train_control = trainControl(method = "cv", number = 10)
# Fit the model
tree_caret <- train(category~., data = storms, method = "rpart", trControl = train_control)
tree_caret

```

```
## CART
##
## 2051 samples
## 12 predictor
## 5 classes: '1', '2', '3', '4', '5'
##
## No pre-processing
## Resampling: Cross-Validated (10 fold)
## Summary of sample sizes: 1845, 1845, 1846, 1847, 1846, 1846, ...
## Resampling results across tuning parameters:
##
##     cp      Accuracy   Kappa
## 0.2668593  0.8867811  0.8319396
## 0.2726397  0.7913703  0.6864027
## 0.3988439  0.6140076  0.3196505
##
## Accuracy was used to select the optimal model using the largest value.
## The final value used for the model was cp = 0.2668593.
```

```
#Accuracy
accuracy<-tree_caret$results$Accuracy
accuracy
```

```
## [1] 0.8867811 0.7913703 0.6140076
```

#problem 2(B)

```
#Problem 2(b)
library(dplyr)
library(caret)
library(rpart)

# Load the storms dataset
data("storms")
storms <- storms[, -1] # Remove the first column

# Remove rows with missing values
storms <- na.omit(storms)

# Convert the target variable 'category' to a factor
storms$category <- as.factor(storms$category)

# Set the seed for reproducibility
set.seed(123)

# Create train control for cross-validation
train_control <- trainControl(method = "cv", number = 10)

# Set hyperparameters for the decision tree
hypers <- rpart.control(minsplit = 5, maxdepth = 2, minbucket = 3)

# Build the decision tree model using cross-validation
tree2 <- train(category ~ ., data = storms, method = "rpart", trControl = train_control, control = hypers)

# Evaluate the model fit
tree2
```

CART

##

2051 samples

11 predictor

5 classes: '1', '2', '3', '4', '5'

##

No pre-processing

Resampling: Cross-Validated (10 fold)

Summary of sample sizes: 1844, 1847, 1847, 1846, 1848, 1845, ...

Resampling results across tuning parameters:

##

## cp	## Accuracy	## Kappa
## 0.2668593	## 0.8337486	## 0.7530947
## 0.2726397	## 0.7775851	## 0.6645115
## 0.3988439	## 0.5940132	## 0.2665173

##

Accuracy was used to select the optimal model using the largest value.

The final value used for the model was cp = 0.2668593.

```
# Predict on the full dataset
pred_tree <- predict(tree2, storms)

# Confusion Matrix for the full dataset
confusionMatrix(storms$category, pred_tree)
```

```
## Confusion Matrix and Statistics
##
##          Reference
## Prediction 1 2 3 4 5
##       1 1013 0 0 0 0
##       2 0 414 0 0 0
##       3 0 0 0 277 0
##       4 0 0 0 283 0
##       5 0 0 0 64 0
##
## Overall Statistics
##
##          Accuracy : 0.8337
## 95% CI : (0.8169, 0.8496)
## No Information Rate : 0.4939
## P-Value [Acc > NIR] : < 2.2e-16
##
##          Kappa : 0.7531
##
## McNemar's Test P-Value : NA
##
## Statistics by Class:
##
##          Class: 1 Class: 2 Class: 3 Class: 4 Class: 5
## Sensitivity      1.0000 1.0000     NA 0.4535     NA
## Specificity      1.0000 1.0000 0.8649 1.0000 0.9688
## Pos Pred Value   1.0000 1.0000     NA 1.0000     NA
## Neg Pred Value   1.0000 1.0000     NA 0.8071     NA
## Prevalence       0.4939 0.2019 0.0000 0.3042 0.0000
## Detection Rate   0.4939 0.2019 0.0000 0.1380 0.0000
## Detection Prevalence 0.4939 0.2019 0.1351 0.1380 0.0312
## Balanced Accuracy 1.0000 1.0000     NA 0.7268     NA
```

```

index <- createDataPartition(y = storms$category, p = 0.7, list = FALSE)

# Create the training and test sets
train_set <- storms[index, ]
test_set <- storms[-index, ]

# Build the decision tree model on the training set
tree3 <- train(category ~ ., data = train_set, method = "rpart", trControl = train_control, control = hypers)

# Evaluate the model on the training set
pred_tree_train <- predict(tree3, train_set)

# Confusion Matrix for the training set
confusionMatrix(train_set$category, pred_tree_train)

```

```

## Confusion Matrix and Statistics
##
##          Reference
## Prediction 1 2 3 4 5
##       1 710 0 0 0 0
##       2 0 290 0 0 0
##       3 0 0 0 194 0
##       4 0 0 0 199 0
##       5 0 0 0 45 0
##
## Overall Statistics
##
##          Accuracy : 0.8338
##                 95% CI : (0.8135, 0.8527)
##      No Information Rate : 0.4937
##      P-Value [Acc > NIR] : < 2.2e-16
##
##          Kappa : 0.7532
##
## McNemar's Test P-Value : NA
##
## Statistics by Class:
##
##          Class: 1 Class: 2 Class: 3 Class: 4 Class: 5
## Sensitivity      1.0000 1.0000     NA 0.4543     NA
## Specificity      1.0000 1.0000 0.8651 1.0000 0.96871
## Pos Pred Value   1.0000 1.0000     NA 1.0000     NA
## Neg Pred Value   1.0000 1.0000     NA 0.8071     NA
## Prevalence       0.4937 0.2017 0.0000 0.3046 0.00000
## Detection Rate   0.4937 0.2017 0.0000 0.1384 0.00000
## Detection Prevalence 0.4937 0.2017 0.1349 0.1384 0.03129
## Balanced Accuracy 1.0000 1.0000     NA 0.7272     NA

```

```
# Evaluate the model on the test set
pred_tree_test <- predict(tree3, test_set)

# Confusion Matrix for the test set
confusionMatrix(test_set$category, pred_tree_test)
```

```
## Confusion Matrix and Statistics
##
##          Reference
## Prediction 1 2 3 4 5
##          1 303 0 0 0 0
##          2 0 124 0 0 0
##          3 0 0 0 83 0
##          4 0 0 0 84 0
##          5 0 0 0 19 0
##
## Overall Statistics
##
##          Accuracy : 0.8336
## 95% CI : (0.8017, 0.8622)
## No Information Rate : 0.4943
## P-Value [Acc > NIR] : < 2.2e-16
##
##          Kappa : 0.7528
##
## McNemar's Test P-Value : NA
##
## Statistics by Class:
##
##          Class: 1 Class: 2 Class: 3 Class: 4 Class: 5
## Sensitivity      1.0000 1.0000     NA 0.4516     NA
## Specificity       1.0000 1.0000 0.8646 1.0000 0.969
## Pos Pred Value    1.0000 1.0000     NA 1.0000     NA
## Neg Pred Value    1.0000 1.0000     NA 0.8072     NA
## Prevalence        0.4943 0.2023 0.0000 0.3034     0.000
## Detection Rate    0.4943 0.2023 0.0000 0.1370     0.000
## Detection Prevalence 0.4943 0.2023 0.1354 0.1370 0.031
## Balanced Accuracy 1.0000 1.0000     NA 0.7258     NA
```

#problem 3(A)

```
library(caret)
library(dplyr)
head(storms)
```

```
## # A tibble: 6 × 12
##   year month day hour lat long status category wind pressure
##   <dbl> <dbl> <int> <dbl> <dbl> <dbl> <fct>    <fct>    <int>    <int>
## 1 2004     8     3     6  33  -77.4 hurricane 1          70      983
## 2 2004     8     3    12  34.2 -76.4 hurricane 2          85      974
## 3 2004     8     3    18  35.3 -75.2 hurricane 2          85      972
## 4 2004     8     4     0  36  -73.7 hurricane 1          80      974
## 5 2004     8     4     6  36.8 -72.1 hurricane 1          80      973
## 6 2004     8     4    12  37.3 -70.2 hurricane 2          85      973
## # i 2 more variables: tropicalstorm_force_diameter <int>,
## #   hurricane_force_diameter <int>
```

```
storms_clean <- na.omit(storms)
head(storms_clean)
```

```
## # A tibble: 6 × 12
##   year month day hour lat long status category wind pressure
##   <dbl> <dbl> <int> <dbl> <dbl> <dbl> <fct>    <fct>    <int>    <int>
## 1 2004     8     3     6  33  -77.4 hurricane 1          70      983
## 2 2004     8     3    12  34.2 -76.4 hurricane 2          85      974
## 3 2004     8     3    18  35.3 -75.2 hurricane 2          85      972
## 4 2004     8     4     0  36  -73.7 hurricane 1          80      974
## 5 2004     8     4     6  36.8 -72.1 hurricane 1          80      973
## 6 2004     8     4    12  37.3 -70.2 hurricane 2          85      973
## # i 2 more variables: tropicalstorm_force_diameter <int>,
## #   hurricane_force_diameter <int>
```

```
storms_clean$category <- as.factor(storms_clean$category)

#(A)
# Set a random seed for reproducibility
set.seed(123)
train_index <- createDataPartition(storms_clean$category, p = 0.8, list =
FALSE)
# Create training and testing datasets
train_data <- storms_clean[train_index, ]
test_data <- storms_clean[-train_index, ]

#(B)
# Load required libraries
library(rpart)
library(rpart.plot)
train_control = trainControl(method = "cv", number = 10)
hypers = rpart.control(minsplit = 2, maxdepth = 3, minbucket=1)
tree_model_1 <- train(category~ ., data = train_data, control = hypers,
trControl = train_control, method = "rpart1SE")
hypers = rpart.control(minsplit = 3, maxdepth = 4, minbucket=2)
tree_model_2 <- train(category~ ., data = train_data, control = hypers,
trControl = train_control, method = "rpart1SE")
hypers = rpart.control(minsplit = 4, maxdepth = 5, minbucket=3)
tree_model_3 <- train(category~ ., data = train_data, control = hypers,
trControl = train_control, method = "rpart1SE")
hypers = rpart.control(minsplit = 5, maxdepth = 6, minbucket=4)
tree_model_4 <- train(category~ ., data = train_data, control = hypers,
trControl = train_control, method = "rpart1SE")

hypers = rpart.control(minsplit = 6, maxdepth = 7, minbucket=5)
tree_model_5 <- train(category~ ., data = train_data, control = hypers,
trControl = train_control, method = "rpart1SE")
hypers = rpart.control(minsplit = 7, maxdepth = 8, minbucket=6)
tree_model_6 <- train(category~ ., data = train_data, control = hypers,
trControl = train_control, method = "rpart1SE")
hypers = rpart.control(minsplit = 8, maxdepth = 9, minbucket=7)
tree_model_7 <- train(category~ ., data = train_data, control = hypers,
trControl = train_control, method = "rpart1SE")
hypers = rpart.control(minsplit = 9, maxdepth = 10, minbucket=8)
tree_model_8 <- train(category~ ., data = train_data, control = hypers,
trControl = train_control, method = "rpart1SE")
hypers = rpart.control(minsplit = 5, maxdepth = 2, minbucket=5)
tree_model_9 <- train(category~ ., data = train_data, control = hypers,
trControl = train_control, method = "rpart1SE")
hypers = rpart.control(minsplit = 7, maxdepth = 3, minbucket=7)
tree_model_10 <- train(category~ ., data = train_data, control = hypers,
trControl = train_control, method = "rpart1SE")
#Evaluating both training and testing sets
train_preds_1 <- predict(tree_model_1, train_data, type = "raw")
test_preds_1 <- predict(tree_model_1, test_data, type = "raw")
train_preds_2 <- predict(tree_model_2, train_data, type = "raw")
```

```

test_preds_2 <- predict(tree_model_2, test_data, type = "raw")
train_preds_3 <- predict(tree_model_3, train_data, type = "raw")
test_preds_3 <- predict(tree_model_3, test_data, type = "raw")
train_preds_4 <- predict(tree_model_4, train_data, type = "raw")
test_preds_4 <- predict(tree_model_4, test_data, type = "raw")
train_preds_5 <- predict(tree_model_5, train_data, type = "raw")
test_preds_5 <- predict(tree_model_5, test_data, type = "raw")
train_preds_6 <- predict(tree_model_6, train_data, type = "raw")
test_preds_6 <- predict(tree_model_6, test_data, type = "raw")
train_preds_7 <- predict(tree_model_7, train_data, type = "raw")
test_preds_7 <- predict(tree_model_7, test_data, type = "raw")
train_preds_8 <- predict(tree_model_8, train_data, type = "raw")
test_preds_8 <- predict(tree_model_8, test_data, type = "raw")
train_preds_9 <- predict(tree_model_9, train_data, type = "raw")
test_preds_9 <- predict(tree_model_9, test_data, type = "raw")
train_preds_10 <- predict(tree_model_10, train_data, type = "raw")
test_preds_10 <- predict(tree_model_10, test_data, type = "raw")

#Calculated training and testing accuracies
training_accuracy_1 <- mean(train_preds_1 == train_data$category)
testing_accuracy_1 <- mean(test_preds_1 == test_data$category)
training_accuracy_2 <- mean(train_preds_2 == train_data$category)
testing_accuracy_2 <- mean(test_preds_2 == test_data$category)
training_accuracy_3 <- mean(train_preds_3 == train_data$category)
testing_accuracy_3 <- mean(test_preds_3 == test_data$category)
training_accuracy_4 <- mean(train_preds_4 == train_data$category)
testing_accuracy_4 <- mean(test_preds_4 == test_data$category)
training_accuracy_5 <- mean(train_preds_5 == train_data$category)
testing_accuracy_5 <- mean(test_preds_5 == test_data$category)
training_accuracy_6 <- mean(train_preds_6 == train_data$category)
testing_accuracy_6 <- mean(test_preds_6 == test_data$category)
training_accuracy_7 <- mean(train_preds_7 == train_data$category)
testing_accuracy_7 <- mean(test_preds_7 == test_data$category)
training_accuracy_8 <- mean(train_preds_8 == train_data$category)
testing_accuracy_8 <- mean(test_preds_8 == test_data$category)
training_accuracy_9 <- mean(train_preds_9 == train_data$category)
testing_accuracy_9 <- mean(test_preds_9 == test_data$category)
training_accuracy_10 <- mean(train_preds_10 == train_data$category)
testing_accuracy_10 <- mean(test_preds_10 == test_data$category)

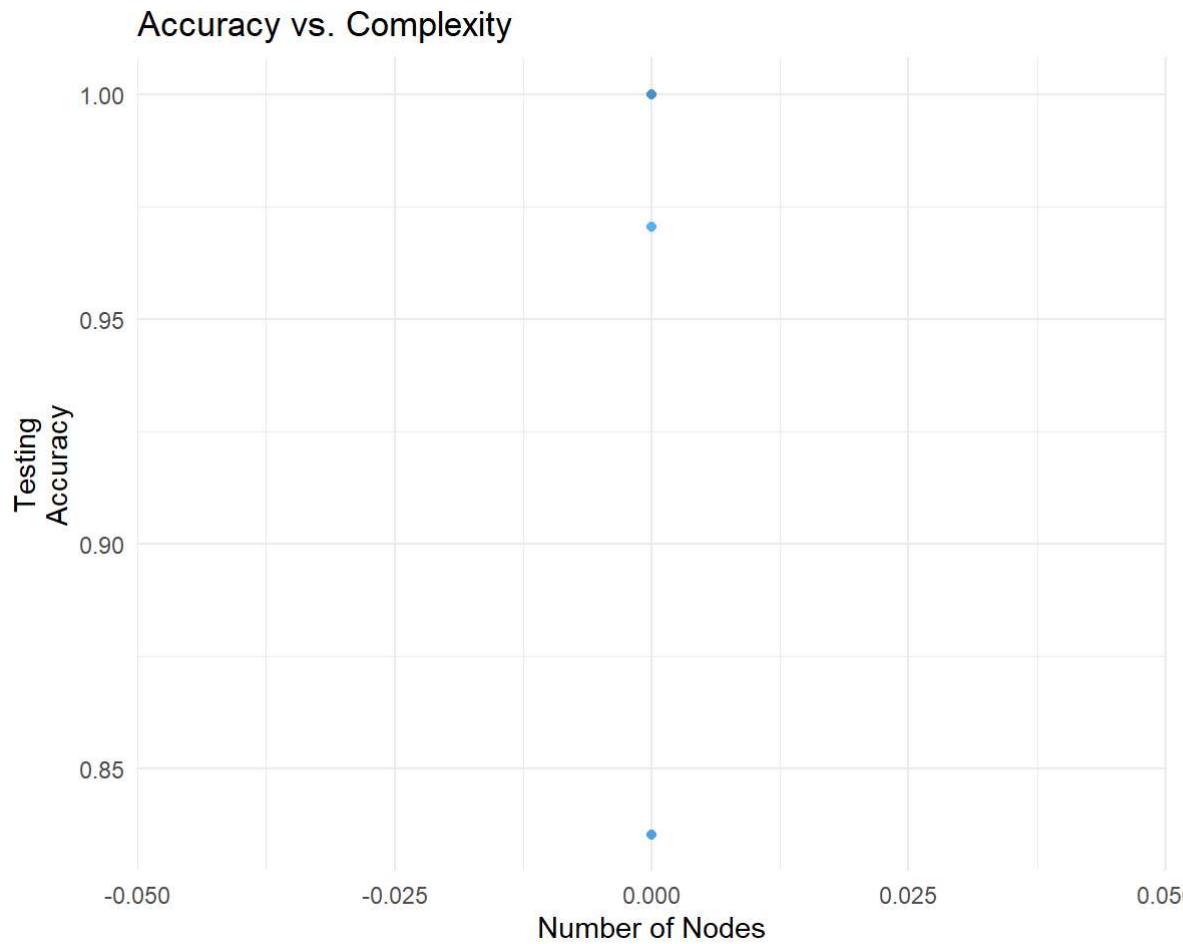
# Create a results table
results_table <- data.frame(
  Model = 1:10,
  maxdepth = c(3, 4, 5, 6, 7, 8, 9, 10, 5 , 7),
  minsplit = c(2 ,3 ,4 , 5 , 6, 7, 8, 9, 2, 3),
  minbucket = c(1, 2, 3, 4, 5, 6, 7, 8, 5, 7),
  num_nodes = c(
    sum(tree_model_1$frame$var != "<leaf>"),
    sum(tree_model_2$frame$var != "<leaf>"),
    sum(tree_model_3$frame$var != "<leaf>"),
    sum(tree_model_4$frame$var != "<leaf>"),
    sum(tree_model_5$frame$var != "<leaf>"),
    sum(tree_model_6$frame$var != "<leaf>"),
    sum(tree_model_7$frame$var != "<leaf>"),
    sum(tree_model_8$frame$var != "<leaf>"),
    sum(tree_model_9$frame$var != "<leaf>"),
    sum(tree_model_10$frame$var != "<leaf>"))
)

```

```
sum(tree_model_7$frame$var != "<leaf>"),
sum(tree_model_8$frame$var != "<leaf>"),
sum(tree_model_9$frame$var != "<leaf>"),
sum(tree_model_10$frame$var != "<leaf>")
),
training_accuracy = c(
  training_accuracy_1,
  training_accuracy_2,
  training_accuracy_3,
  training_accuracy_4,
  training_accuracy_5,
  training_accuracy_6,
  training_accuracy_7,
  training_accuracy_8,
  training_accuracy_9,
  training_accuracy_10
),
testing_accuracy = c(
  testing_accuracy_1,
  testing_accuracy_2,
  testing_accuracy_3,
  testing_accuracy_4,
  testing_accuracy_5,
  testing_accuracy_6,
  testing_accuracy_7,
  testing_accuracy_8,
  testing_accuracy_9,
  testing_accuracy_10
)
)
results_table
```

```
##      Model maxdepth minsplit minbucket num_nodes training_accuracy
## 1      1         3        2       1       0     0.9683698
## 2      2         4        3       2       0     1.0000000
## 3      3         5        4       3       0     1.0000000
## 4      4         6        5       4       0     1.0000000
## 5      5         7        6       5       0     1.0000000
## 6      6         8        7       6       0     1.0000000
## 7      7         9        8       7       0     1.0000000
## 8      8        10        9       8       0     1.0000000
## 9      9         5        2       5       0     0.8333333
## 10    10         7        3       7       0     0.9683698
##      testing_accuracy
## 1      0.9705160
## 2      1.0000000
## 3      1.0000000
## 4      1.0000000
## 5      1.0000000
## 6      1.0000000
## 7      1.0000000
## 8      1.0000000
## 9      0.8353808
## 10    0.9705160
```

```
library(ggplot2)
ggplot(results_table, aes(x = num_nodes, y = testing_accuracy)) +
  geom_point(aes(color = Model)) +
  labs(title = "Accuracy vs. Complexity", x = "Number of Nodes", y = "Testing Accuracy") +
  theme_minimal()
```



```
#(C)
selected_model_params <- rpart.control(minsplit = 3, maxdepth = 4, minbucket
= 2)
library(caret)
selected_model <- tree_model_2
test_preds <- predict(selected_model, test_data, type = "prob")
confusion_matrix <- confusionMatrix(data = test_preds_2, reference =
test_data$category)
confusion_matrix
```

```

## Confusion Matrix and Statistics
##
##             Reference
## Prediction 1 2 3 4 5
##          1 202 0 0 0 0
##          2 0 82 0 0 0
##          3 0 0 55 0 0
##          4 0 0 0 56 0
##          5 0 0 0 0 12
##
## Overall Statistics
##
##                 Accuracy : 1
##                 95% CI : (0.991, 1)
## No Information Rate : 0.4963
## P-Value [Acc > NIR] : < 2.2e-16
##
##                 Kappa : 1
##
## McNemar's Test P-Value : NA
##
## Statistics by Class:
##
##                                Class: 1 Class: 2 Class: 3 Class: 4 Class: 5
## Sensitivity              1.0000 1.0000 1.0000 1.0000 1.00000
## Specificity               1.0000 1.0000 1.0000 1.0000 1.00000
## Pos Pred Value            1.0000 1.0000 1.0000 1.0000 1.00000
## Neg Pred Value            1.0000 1.0000 1.0000 1.0000 1.00000
## Prevalence                0.4963 0.2015 0.1351 0.1376 0.02948
## Detection Rate            0.4963 0.2015 0.1351 0.1376 0.02948
## Detection Prevalence      0.4963 0.2015 0.1351 0.1376 0.02948
## Balanced Accuracy          1.0000 1.0000 1.0000 1.0000 1.00000

```

#problem 4

```

# Load the required libraries
library(caret)
library(caret)

library(rpart)
library(tidyverse)

```

```
## — Attaching core tidyverse packages ————— tidyverse 2.0.0 —
## ✓forcats 1.0.0 ✓stringr 1.5.0
## ✓lubridate 1.9.3 ✓tibble 3.2.1
## ✓purrr 1.0.2 ✓tidyrr 1.3.0
## ✓readr 2.1.4
## — Conflicts ————— tidyverse_conflicts() —
## ✗dplyr::filter() masks stats::filter()
## ✗dplyr::lag() masks stats::lag()
## ✗purrr::lift() masks caret::lift()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```
library(ggplot2)
library(dplyr)
library(randomForest)
```

```
## randomForest 4.7-1.1
## Type rfNews() to see new features/changes/bug fixes.
##
## Attaching package: 'randomForest'
##
## The following object is masked from 'package:dplyr':
##       combine
##
## The following object is masked from 'package:ggplot2':
##       margin
```

```
# Load the dataset
data <- read.csv("Bank_Modified.csv")
data
```

##	X	cont1	cont2	cont3	bool1	bool2	cont4	bool3	cont5	cont6	approval
## 1	1	30.83	0.000	1.250	t	t	1	f	202	0	+
## 2	2	58.67	4.460	3.040	t	t	6	f	43	560	+
## 3	3	24.50	0.500	1.500	t	f	0	f	280	824	+
## 4	4	27.83	1.540	3.750	t	t	5	t	100	3	+
## 5	5	20.17	5.625	1.710	t	f	0	f	120	0	+
## 6	6	32.08	4.000	2.500	t	f	0	t	360	0	+
## 7	7	33.17	1.040	6.500	t	f	0	t	164	31285	+
## 8	8	22.92	11.585	0.040	t	f	0	f	80	1349	+
## 9	9	54.42	0.500	3.960	t	f	0	f	180	314	+
## 10	10	42.50	4.915	3.165	t	f	0	t	52	1442	+
## 11	11	22.08	0.830	2.165	f	f	0	t	128	0	+
## 12	12	29.92	1.835	4.335	t	f	0	f	260	200	+
## 13	13	38.25	6.000	1.000	t	f	0	t	0	0	+
## 14	14	48.08	6.040	0.040	f	f	0	f	0	2690	+
## 15	15	45.83	10.500	5.000	t	t	7	t	0	0	+
## 16	16	36.67	4.415	0.250	t	t	10	t	320	0	+
## 17	17	28.25	0.875	0.960	t	t	3	t	396	0	+
## 18	18	23.25	5.875	3.170	t	t	10	f	120	245	+
## 19	19	21.83	0.250	0.665	t	f	0	t	0	0	+
## 20	20	19.17	8.585	0.750	t	t	7	f	96	0	+
## 21	21	25.00	11.250	2.500	t	t	17	f	200	1208	+
## 22	22	23.25	1.000	0.835	t	f	0	f	300	0	+
## 23	23	47.75	8.000	7.875	t	t	6	t	0	1260	+
## 24	24	27.42	14.500	3.085	t	t	1	f	120	11	+
## 25	25	41.17	6.500	0.500	t	t	3	t	145	0	+
## 26	26	15.83	0.585	1.500	t	t	2	f	100	0	+
## 27	27	47.00	13.000	5.165	t	t	9	t	0	0	+
## 28	28	56.58	18.500	15.000	t	t	17	t	0	0	+
## 29	29	57.42	8.500	7.000	t	t	3	f	0	0	+
## 30	30	42.08	1.040	5.000	t	t	6	t	500	10000	+
## 31	31	29.25	14.790	5.040	t	t	5	t	168	0	+
## 32	32	42.00	9.790	7.960	t	t	8	f	0	0	+
## 33	33	49.50	7.585	7.585	t	t	15	t	0	5000	+
## 34	34	36.75	5.125	5.000	t	f	0	t	0	4000	+
## 35	35	22.58	10.750	0.415	t	t	5	t	0	560	+
## 36	36	27.83	1.500	2.000	t	t	11	t	434	35	+
## 37	37	27.25	1.585	1.835	t	t	12	t	583	713	+
## 38	38	23.00	11.750	0.500	t	t	2	t	300	551	+
## 39	39	27.75	0.585	0.250	t	t	2	f	260	500	+
## 40	40	54.58	9.415	14.415	t	t	11	t	30	300	+
## 41	41	34.17	9.170	4.500	t	t	12	t	0	221	+
## 42	42	28.92	15.000	5.335	t	t	11	f	0	2283	+
## 43	43	29.67	1.415	0.750	t	t	1	f	240	100	+
## 44	44	39.58	13.915	8.625	t	t	6	t	70	0	+
## 45	45	56.42	28.000	28.500	t	t	40	f	0	15	+
## 46	46	54.33	6.750	2.625	t	t	11	t	0	284	+
## 47	47	41.00	2.040	0.125	t	t	23	t	455	1236	+
## 48	48	31.92	4.460	6.040	t	t	3	f	311	300	+
## 49	49	41.50	1.540	3.500	f	f	0	f	216	0	+
## 50	50	23.92	0.665	0.165	f	f	0	f	100	0	+
## 51	51	25.75	0.500	0.875	t	f	0	t	491	0	+

## 52	52	26.00	1.000	1.750	t	f	0	t	280	0	+
## 53	53	37.42	2.040	0.040	t	f	0	t	400	5800	+
## 54	54	34.92	2.500	0.000	t	f	0	t	239	200	+
## 55	55	34.25	3.000	7.415	t	f	0	t	0	0	+
## 56	56	23.33	11.625	0.835	t	f	0	t	160	300	+
## 57	57	23.17	0.000	0.085	t	f	0	f	0	0	+
## 58	58	44.33	0.500	5.000	t	f	0	t	320	0	+
## 59	59	35.17	4.500	5.750	f	f	0	t	711	0	+
## 60	60	43.25	3.000	6.000	t	t	11	f	80	0	+
## 61	61	56.75	12.250	1.250	t	t	4	t	200	0	+
## 62	62	31.67	16.165	3.000	t	t	9	f	250	730	+
## 63	63	23.42	0.790	1.500	t	t	2	t	80	400	+
## 64	64	20.42	0.835	1.585	t	t	1	f	0	0	+
## 65	65	26.67	4.250	4.290	t	t	1	t	120	0	+
## 66	66	34.17	1.540	1.540	t	t	1	t	520	50000	+
## 67	67	36.00	1.000	2.000	t	t	11	f	0	456	+
## 68	68	25.50	0.375	0.250	t	t	3	f	260	15108	+
## 69	69	19.42	6.500	1.460	t	t	7	f	80	2954	+
## 70	70	35.17	25.125	1.625	t	t	1	t	515	500	+
## 71	71	32.33	7.500	1.585	t	f	0	t	420	0	-
## 72	72	34.83	4.000	12.500	t	f	0	t	NA	0	-
## 73	73	38.58	5.000	13.500	t	f	0	t	980	0	-
## 74	74	44.25	0.500	10.750	t	f	0	f	400	0	-
## 75	75	44.83	7.000	1.625	f	f	0	f	160	2	-
## 76	76	20.67	5.290	0.375	t	t	1	f	160	0	-
## 77	77	34.08	6.500	0.125	t	f	0	t	443	0	-
## 78	78	19.17	0.585	0.585	t	f	0	t	160	0	-
## 79	79	21.67	1.165	2.500	t	t	1	f	180	20	-
## 80	80	21.50	9.750	0.250	t	f	0	f	140	0	-
## 81	81	49.58	19.000	0.000	t	t	1	f	94	0	-
## 82	82	27.67	1.500	2.000	t	f	0	f	368	0	-
## 83	83	39.83	0.500	0.250	t	f	0	f	288	0	-
## 84	84	NA	3.500	3.000	t	f	0	t	300	0	-
## 85	85	27.25	0.625	0.455	t	f	0	t	200	0	-
## 86	86	37.17	4.000	5.000	t	f	0	t	280	0	-
## 87	87	NA	0.375	0.875	t	f	0	t	928	0	-
## 88	88	25.67	2.210	4.000	t	f	0	f	188	0	-
## 89	89	34.00	4.500	1.000	t	f	0	t	240	0	-
## 90	90	49.00	1.500	0.000	t	f	0	t	100	27	-
## 91	91	62.50	12.750	5.000	t	f	0	f	112	0	-
## 92	92	31.42	15.500	0.500	t	f	0	f	120	0	-
## 93	93	NA	5.000	8.500	t	f	0	f	0	0	-
## 94	94	52.33	1.375	9.460	t	f	0	t	200	100	-
## 95	95	28.75	1.500	1.500	t	f	0	t	0	225	-
## 96	96	28.58	3.540	0.500	t	f	0	t	171	0	-
## 97	97	23.00	0.625	0.125	t	f	0	f	180	1	-
## 98	98	NA	0.500	0.835	t	f	0	t	320	0	-
## 99	99	22.50	11.000	3.000	t	f	0	t	268	0	-
## 100	100	28.50	1.000	1.000	t	t	2	t	167	500	-
## 101	101	37.50	1.750	0.250	t	f	0	t	164	400	-
## 102	102	35.25	16.500	4.000	t	f	0	f	80	0	-
## 103	103	18.67	5.000	0.375	t	t	2	f	0	38	-

## 104	104	25.00	12.000	2.250	t	t	2	t	120	5	-
## 105	105	27.83	4.000	5.750	t	t	2	t	75	0	-
## 106	106	54.83	15.500	0.000	t	t	20	f	152	130	-
## 107	107	28.75	1.165	0.500	t	f	0	f	280	0	-
## 108	108	25.00	11.000	4.500	t	f	0	f	120	0	-
## 109	109	40.92	2.250	10.000	t	f	0	t	176	0	-
## 110	110	19.75	0.750	0.795	t	t	5	t	140	5	-
## 111	111	29.17	3.500	3.500	t	t	3	t	329	0	-
## 112	112	24.50	1.040	0.500	t	t	3	f	180	147	-
## 113	113	24.58	12.500	0.875	t	f	0	t	260	0	-
## 114	114	33.75	0.750	1.000	t	t	3	t	212	0	-
## 115	115	20.67	1.250	1.375	t	t	3	t	140	210	-
## 116	116	25.42	1.125	1.290	t	t	2	f	200	0	-
## 117	117	37.75	7.000	11.500	t	t	7	t	300	5	-
## 118	118	52.50	6.500	6.290	t	t	15	f	0	11202	+
## 119	119	57.83	7.040	14.000	t	t	6	t	360	1332	+
## 120	120	20.75	10.335	0.335	t	t	1	t	80	50	+
## 121	121	39.92	6.210	0.040	t	t	1	f	200	300	+
## 122	122	25.67	12.500	1.210	t	t	67	t	140	258	+
## 123	123	24.75	12.500	1.500	t	t	12	t	120	567	+
## 124	124	44.17	6.665	7.375	t	t	3	t	0	0	+
## 125	125	23.50	9.000	8.500	t	t	5	t	120	0	+
## 126	126	34.92	5.000	7.500	t	t	6	t	0	1000	+
## 127	127	47.67	2.500	2.500	t	t	12	t	410	2510	+
## 128	128	22.75	11.000	2.500	t	t	7	t	100	809	+
## 129	129	34.42	4.250	3.250	t	t	2	f	274	610	+
## 130	130	28.42	3.500	0.835	t	f	0	f	280	0	+
## 131	131	67.75	5.500	13.000	t	t	1	t	0	0	+
## 132	132	20.42	1.835	2.250	t	t	1	f	100	150	+
## 133	133	47.42	8.000	6.500	t	t	6	f	375	51100	+
## 134	134	36.25	5.000	2.500	t	t	6	f	0	367	+
## 135	135	32.67	5.500	5.500	t	t	12	t	408	1000	+
## 136	136	48.58	6.500	6.000	t	f	0	t	350	0	+
## 137	137	39.92	0.540	0.500	t	t	3	f	200	1000	+
## 138	138	33.58	2.750	4.250	t	t	6	f	204	0	+
## 139	139	18.83	9.500	1.625	t	t	6	t	40	600	+
## 140	140	26.92	13.500	5.000	t	t	2	f	0	5000	+
## 141	141	31.25	3.750	0.625	t	t	9	t	181	0	+
## 142	142	56.50	16.000	0.000	t	t	15	f	0	247	+
## 143	143	43.00	0.290	1.750	t	t	8	f	100	375	+
## 144	144	22.33	11.000	2.000	t	t	1	f	80	278	+
## 145	145	27.25	1.665	5.085	t	t	9	f	399	827	+
## 146	146	32.83	2.500	2.750	t	t	6	f	160	2072	+
## 147	147	23.25	1.500	2.375	t	t	3	t	0	582	+
## 148	148	40.33	7.540	8.000	t	t	14	f	0	2300	+
## 149	149	30.50	6.500	4.000	t	t	7	t	0	3065	+
## 150	150	52.83	15.000	5.500	t	t	14	f	0	2200	+
## 151	151	46.67	0.460	0.415	t	t	11	t	440	6	+
## 152	152	58.33	10.000	4.000	t	t	14	f	0	1602	+
## 153	153	37.33	6.500	4.250	t	t	12	t	93	0	+
## 154	154	23.08	2.500	1.085	t	t	11	t	60	2184	+
## 155	155	32.75	1.500	5.500	t	t	3	t	0	0	+

## 156	156	21.67	11.500	0.000	t	t	11	t	0	0	+
## 157	157	28.50	3.040	2.540	t	t	1	f	70	0	+
## 158	158	68.67	15.000	0.000	t	t	14	f	0	3376	+
## 159	159	28.00	2.000	4.165	t	t	2	t	181	0	+
## 160	160	34.08	0.080	0.040	t	t	1	t	280	2000	+
## 161	161	27.67	2.000	1.000	t	t	4	f	140	7544	+
## 162	162	44.00	2.000	1.750	t	t	2	t	0	15	+
## 163	163	25.08	1.710	1.665	t	t	1	t	395	20	+
## 164	164	32.00	1.750	0.040	t	f	0	t	393	0	+
## 165	165	60.58	16.500	11.000	t	f	0	t	21	10561	+
## 166	166	40.83	10.000	1.750	t	f	0	f	29	837	+
## 167	167	19.33	9.500	1.000	t	f	0	t	60	400	+
## 168	168	32.33	0.540	0.040	t	f	0	f	440	11177	+
## 169	169	36.67	3.250	9.000	t	f	0	t	102	639	+
## 170	170	37.50	1.125	1.500	f	f	0	t	431	0	+
## 171	171	25.08	2.540	0.250	t	f	0	t	370	0	+
## 172	172	41.33	0.000	15.000	t	f	0	f	0	0	+
## 173	173	56.00	12.500	8.000	t	f	0	t	24	2028	+
## 174	174	49.83	13.585	8.500	t	f	0	t	0	0	+
## 175	175	22.67	10.500	1.335	t	f	0	f	100	0	+
## 176	176	27.00	1.500	0.375	t	f	0	t	260	1065	+
## 177	177	25.00	12.500	3.000	t	f	0	t	20	0	+
## 178	178	26.08	8.665	1.415	t	f	0	f	160	150	+
## 179	179	18.42	9.250	1.210	t	t	4	f	60	540	+
## 180	180	20.17	8.170	1.960	t	t	14	f	60	158	+
## 181	181	47.67	0.290	15.000	t	t	20	f	0	15000	+
## 182	182	21.25	2.335	0.500	t	t	4	f	80	0	+
## 183	183	20.67	3.000	0.165	t	t	3	f	100	6	+
## 184	184	57.08	19.500	5.500	t	t	7	f	0	3000	+
## 185	185	22.42	5.665	2.585	t	t	7	f	129	3257	+
## 186	186	48.75	8.500	12.500	t	t	9	f	181	1655	+
## 187	187	40.00	6.500	3.500	t	t	1	f	0	500	+
## 188	188	40.58	5.000	5.000	t	t	7	f	0	3065	+
## 189	189	28.67	1.040	2.500	t	t	5	t	300	1430	+
## 190	190	33.08	4.625	1.625	t	t	2	f	0	0	+
## 191	191	21.33	10.500	3.000	t	f	0	t	0	0	+
## 192	192	42.00	0.205	5.125	t	f	0	f	400	0	+
## 193	193	41.75	0.960	2.500	t	f	0	f	510	600	+
## 194	194	22.67	1.585	3.085	t	t	6	f	80	0	+
## 195	195	34.50	4.040	8.500	t	t	7	t	195	0	+
## 196	196	28.25	5.040	1.500	t	t	8	t	144	7	+
## 197	197	33.17	3.165	3.165	t	t	3	t	380	0	+
## 198	198	48.17	7.625	15.500	t	t	12	f	0	790	+
## 199	199	27.58	2.040	2.000	t	t	3	t	370	560	+
## 200	200	22.58	10.040	0.040	t	t	9	f	60	396	+
## 201	201	24.08	0.500	1.250	t	t	1	f	0	678	+
## 202	202	41.33	1.000	2.250	t	f	0	t	0	300	+
## 203	203	24.83	2.750	2.250	t	t	6	f	NA	600	+
## 204	204	20.75	10.250	0.710	t	t	2	t	49	0	+
## 205	205	36.33	2.125	0.085	t	t	1	f	50	1187	+
## 206	206	35.42	12.000	14.000	t	t	8	f	0	6590	+
## 207	207	71.58	0.000	0.000	f	f	0	f	NA	0	+

## 208	208	28.67	9.335	5.665	t	t	6	f	381	168	+
## 209	209	35.17	2.500	4.500	t	t	7	f	150	1270	+
## 210	210	39.50	4.250	6.500	t	t	16	f	117	1210	+
## 211	211	39.33	5.875	10.000	t	t	14	t	399	0	+
## 212	212	24.33	6.625	5.500	t	f	0	t	100	0	+
## 213	213	60.08	14.500	18.000	t	t	15	t	0	1000	+
## 214	214	23.08	11.500	3.500	t	t	9	f	56	742	+
## 215	215	26.67	2.710	5.250	t	t	1	f	211	0	+
## 216	216	48.17	3.500	3.500	t	f	0	f	230	0	+
## 217	217	41.17	4.040	7.000	t	t	8	f	320	0	+
## 218	218	55.92	11.500	5.000	t	t	5	f	0	8851	+
## 219	219	53.92	9.625	8.665	t	t	5	f	0	0	+
## 220	220	18.92	9.250	1.000	t	t	4	t	80	500	+
## 221	221	50.08	12.540	2.290	t	t	3	t	156	0	+
## 222	222	65.42	11.000	20.000	t	t	7	t	22	0	+
## 223	223	17.58	9.000	1.375	t	f	0	t	0	0	+
## 224	224	18.83	9.540	0.085	t	f	0	f	100	0	+
## 225	225	37.75	5.500	0.125	t	f	0	t	228	0	+
## 226	226	23.25	4.000	0.250	t	f	0	t	160	0	+
## 227	227	18.08	5.500	0.500	t	f	0	f	80	0	+
## 228	228	22.50	8.460	2.460	f	f	0	f	164	0	+
## 229	229	19.67	0.375	2.000	t	t	2	t	80	0	+
## 230	230	22.08	11.000	0.665	t	f	0	f	100	0	+
## 231	231	25.17	3.500	0.625	t	t	7	f	0	7059	+
## 232	232	47.42	3.000	13.875	t	t	2	t	519	1704	+
## 233	233	33.50	1.750	4.500	t	t	4	t	253	857	+
## 234	234	27.67	13.750	5.750	t	f	0	t	487	500	+
## 235	235	58.42	21.000	10.000	t	t	13	f	0	6700	+
## 236	236	20.67	1.835	2.085	t	t	5	f	220	2503	+
## 237	237	26.17	0.250	0.000	t	f	0	t	0	0	+
## 238	238	21.33	7.500	1.415	t	t	1	f	80	9800	+
## 239	239	42.83	4.625	4.580	t	f	0	f	0	0	+
## 240	240	38.17	10.125	2.500	t	t	6	f	520	196	+
## 241	241	20.50	10.000	2.500	t	f	0	f	40	0	+
## 242	242	48.25	25.085	1.750	t	t	3	f	120	14	+
## 243	243	28.33	5.000	11.000	t	f	0	t	70	0	+
## 244	244	18.75	7.500	2.710	t	t	5	f	NA	26726	+
## 245	245	18.50	2.000	1.500	t	t	2	f	120	300	+
## 246	246	33.17	3.040	2.040	t	t	1	t	180	18027	+
## 247	247	45.00	8.500	14.000	t	t	1	t	88	2000	+
## 248	248	19.67	0.210	0.290	t	t	11	f	80	99	+
## 249	249	24.50	12.750	4.750	t	t	2	f	73	444	+
## 250	250	21.83	11.000	0.290	t	t	6	f	121	0	+
## 251	251	40.25	21.500	20.000	t	t	11	f	0	1200	+
## 252	252	41.42	5.000	5.000	t	t	6	t	470	0	+
## 253	253	17.83	11.000	1.000	t	t	11	f	0	3000	+
## 254	254	23.17	11.125	0.460	t	t	1	f	100	0	+
## 255	255	NA	0.625	0.250	f	f	0	f	380	2010	-
## 256	256	18.17	10.250	1.085	f	f	0	f	320	13	-
## 257	257	20.00	11.045	2.000	f	f	0	t	136	0	-
## 258	258	20.00	0.000	0.500	f	f	0	f	144	0	-
## 259	259	20.75	9.540	0.040	f	f	0	f	200	1000	-

## 260	260	24.50	1.750	0.165	f	f	0	f	132	0	-
## 261	261	32.75	2.335	5.750	f	f	0	t	292	0	-
## 262	262	52.17	0.000	0.000	f	f	0	f	0	0	-
## 263	263	48.17	1.335	0.335	f	f	0	f	0	120	-
## 264	264	20.42	10.500	0.000	f	f	0	t	154	32	-
## 265	265	50.75	0.585	0.000	f	f	0	f	145	0	-
## 266	266	17.08	0.085	0.040	f	f	0	f	140	722	-
## 267	267	18.33	1.210	0.000	f	f	0	f	100	0	-
## 268	268	32.00	6.000	1.250	f	f	0	f	272	0	-
## 269	269	59.67	1.540	0.125	t	f	0	t	260	0	+
## 270	270	18.00	0.165	0.210	f	f	0	f	200	40	+
## 271	271	37.58	0.000	0.000	f	f	0	f	NA	0	+
## 272	272	32.33	2.500	1.250	f	f	0	t	280	0	-
## 273	273	18.08	6.750	0.040	f	f	0	f	140	0	-
## 274	274	38.25	10.125	0.125	f	f	0	f	160	0	-
## 275	275	30.67	2.500	2.250	f	f	0	t	340	0	-
## 276	276	18.58	5.710	0.540	f	f	0	f	120	0	-
## 277	277	19.17	5.415	0.290	f	f	0	f	80	484	-
## 278	278	18.17	10.000	0.165	f	f	0	f	340	0	-
## 279	279	24.58	13.500	0.000	f	f	0	f	NA	0	-
## 280	280	16.25	0.835	0.085	t	f	0	f	200	0	-
## 281	281	21.17	0.875	0.250	f	f	0	f	280	204	-
## 282	282	23.92	0.585	0.125	f	f	0	f	240	1	-
## 283	283	17.67	4.460	0.250	f	f	0	f	80	0	-
## 284	284	16.50	1.250	0.250	f	t	1	f	108	98	-
## 285	285	23.25	12.625	0.125	f	t	2	f	0	5552	-
## 286	286	17.58	10.000	0.165	f	t	1	f	120	1	-
## 287	287	NA	1.500	0.000	f	t	2	t	200	105	-
## 288	288	29.50	0.580	0.290	f	t	1	f	340	2803	-
## 289	289	18.83	0.415	0.165	f	t	1	f	200	1	-
## 290	290	21.75	1.750	0.000	f	f	0	f	160	0	-
## 291	291	23.00	0.750	0.500	f	f	0	t	320	0	-
## 292	292	18.25	10.000	1.000	f	t	1	f	120	1	-
## 293	293	25.42	0.540	0.165	f	t	1	f	272	444	-
## 294	294	35.75	2.415	0.125	f	t	2	f	220	1	-
## 295	295	16.08	0.335	0.000	f	t	1	f	160	126	-
## 296	296	31.92	3.125	3.040	f	t	2	t	200	4	-
## 297	297	69.17	9.000	4.000	f	t	1	f	70	6	-
## 298	298	32.92	2.500	1.750	f	t	2	t	720	0	-
## 299	299	16.33	2.750	0.665	f	t	1	f	80	21	-
## 300	300	22.17	12.125	3.335	f	t	2	t	180	173	-
## 301	301	57.58	2.000	6.500	f	t	1	f	0	10	-
## 302	302	18.25	0.165	0.250	f	f	0	t	280	0	-
## 303	303	23.42	1.000	0.500	f	f	0	t	280	0	-
## 304	304	15.92	2.875	0.085	f	f	0	f	120	0	-
## 305	305	24.75	13.665	1.500	f	f	0	f	280	1	-
## 306	306	48.75	26.335	0.000	t	f	0	t	0	0	-
## 307	307	23.50	2.750	4.500	f	f	0	f	160	25	-
## 308	308	18.58	10.290	0.415	f	f	0	f	80	0	-
## 309	309	27.75	1.290	0.250	f	f	0	t	140	0	-
## 310	310	31.75	3.000	0.000	f	f	0	f	160	20	-
## 311	311	24.83	4.500	1.000	f	f	0	t	360	6	-

## 312	312	19.00	1.750	2.335	f	f	0	t	112	6	-
## 313	313	16.33	0.210	0.125	f	f	0	f	200	1	-
## 314	314	18.58	10.000	0.415	f	f	0	f	80	42	-
## 315	315	16.25	0.000	0.250	f	f	0	f	60	0	-
## 316	316	23.00	0.750	0.500	t	f	0	t	320	0	-
## 317	317	21.17	0.250	0.250	f	f	0	f	280	204	-
## 318	318	17.50	22.000	0.000	f	f	0	t	450	100000	+
## 319	319	19.17	0.000	0.000	f	f	0	t	500	1	+
## 320	320	36.75	0.125	1.500	f	f	0	t	232	113	+
## 321	321	21.25	1.500	1.500	f	f	0	f	150	8	+
## 322	322	18.08	0.375	10.000	f	f	0	t	300	0	+
## 323	323	33.67	0.375	0.375	f	f	0	f	300	44	+
## 324	324	48.58	0.205	0.250	t	t	11	f	380	2732	+
## 325	325	33.67	1.250	1.165	f	f	0	f	120	0	-
## 326	326	29.50	1.085	1.000	f	f	0	f	280	13	-
## 327	327	30.17	1.085	0.040	f	f	0	f	170	179	-
## 328	328	40.83	3.500	0.500	f	f	0	f	1160	0	-
## 329	329	34.83	2.500	3.000	f	f	0	f	200	0	-
## 330	330	NA	4.000	0.085	f	f	0	t	411	0	-
## 331	331	20.42	0.000	0.000	f	f	0	f	NA	0	-
## 332	332	33.25	2.500	2.500	f	f	0	t	0	2	-
## 333	333	34.08	2.500	1.000	f	f	0	f	460	16	-
## 334	334	25.25	12.500	1.000	f	f	0	t	180	1062	-
## 335	335	34.75	2.500	0.500	f	f	0	f	348	0	-
## 336	336	27.67	0.750	0.165	f	f	0	t	220	251	-
## 337	337	47.33	6.500	1.000	f	f	0	t	0	228	-
## 338	338	34.83	1.250	0.500	f	f	0	t	160	0	-
## 339	339	33.25	3.000	2.000	f	f	0	f	180	0	-
## 340	340	28.00	3.000	0.750	f	f	0	t	300	67	-
## 341	341	39.08	4.000	3.000	f	f	0	f	480	0	-
## 342	342	42.75	4.085	0.040	f	f	0	f	108	100	-
## 343	343	26.92	2.250	0.500	f	f	0	t	640	4000	-
## 344	344	33.75	2.750	0.000	f	f	0	f	180	0	-
## 345	345	38.92	1.750	0.500	f	f	0	t	300	2	-
## 346	346	62.75	7.000	0.000	f	f	0	f	0	12	-
## 347	347	32.25	1.500	0.250	f	f	0	t	372	122	-
## 348	348	26.75	4.500	2.500	f	f	0	f	200	1210	-
## 349	349	63.33	0.540	0.585	t	t	3	t	180	0	-
## 350	350	27.83	1.500	2.250	f	t	1	t	100	3	-
## 351	351	26.17	2.000	0.000	f	f	0	t	276	1	-
## 352	352	22.17	0.585	0.000	f	f	0	f	100	0	-
## 353	353	22.50	11.500	1.500	f	f	0	t	0	4000	-
## 354	354	30.75	1.585	0.585	f	f	0	t	0	0	-
## 355	355	36.67	2.000	0.250	f	f	0	t	221	0	-
## 356	356	16.00	0.165	1.000	f	t	2	t	320	1	-
## 357	357	41.17	1.335	0.165	f	f	0	f	168	0	-
## 358	358	19.50	0.165	0.040	f	f	0	t	380	0	-
## 359	359	32.42	3.000	0.165	f	f	0	t	120	0	-
## 360	360	36.75	4.710	0.000	f	f	0	f	160	0	-
## 361	361	30.25	5.500	5.500	f	f	0	t	100	0	-
## 362	362	23.08	2.500	0.085	f	f	0	t	100	4208	-
## 363	363	26.83	0.540	0.000	f	f	0	f	100	0	-

## 364	364	16.92	0.335	0.290	f	f	0	f	200	0	-
## 365	365	24.42	2.000	0.165	f	t	2	f	320	1300	-
## 366	366	42.83	1.250	13.875	f	t	1	t	352	112	-
## 367	367	22.75	6.165	0.165	f	f	0	f	220	1000	-
## 368	368	39.42	1.710	0.165	f	f	0	f	400	0	-
## 369	369	23.58	11.500	3.000	f	f	0	t	20	16	-
## 370	370	21.42	0.750	0.750	f	f	0	t	132	2	-
## 371	371	33.00	2.500	7.000	f	f	0	t	280	0	-
## 372	372	26.33	13.000	0.000	f	f	0	t	140	1110	-
## 373	373	45.00	4.585	1.000	f	f	0	t	240	0	-
## 374	374	26.25	1.540	0.125	f	f	0	f	100	0	-
## 375	375	28.17	0.585	0.040	f	f	0	f	260	1004	-
## 376	376	20.83	0.500	1.000	f	f	0	f	260	0	-
## 377	377	28.67	14.500	0.125	f	f	0	f	0	286	-
## 378	378	20.67	0.835	2.000	f	f	0	t	240	0	-
## 379	379	34.42	1.335	0.125	f	f	0	t	440	4500	-
## 380	380	33.58	0.250	4.000	f	f	0	t	420	0	-
## 381	381	43.17	5.000	2.250	f	f	0	t	141	0	-
## 382	382	22.67	7.000	0.165	f	f	0	f	160	0	-
## 383	383	24.33	2.500	4.500	f	f	0	f	200	456	-
## 384	384	56.83	4.250	5.000	f	f	0	t	0	4	-
## 385	385	22.08	11.460	1.585	f	f	0	t	100	1212	-
## 386	386	34.00	5.500	1.500	f	f	0	t	60	0	-
## 387	387	22.58	1.500	0.540	f	f	0	t	120	67	-
## 388	388	21.17	0.000	0.500	f	f	0	t	0	0	-
## 389	389	26.67	14.585	0.000	f	f	0	t	178	0	-
## 390	390	22.92	0.170	0.085	f	f	0	f	0	0	-
## 391	391	15.17	7.000	1.000	f	f	0	f	600	0	-
## 392	392	39.92	5.000	0.210	f	f	0	f	550	0	-
## 393	393	27.42	12.500	0.250	f	f	0	t	720	0	-
## 394	394	24.75	0.540	1.000	f	f	0	t	120	1	-
## 395	395	41.17	1.250	0.250	f	f	0	f	0	195	-
## 396	396	33.08	1.625	0.540	f	f	0	t	0	0	-
## 397	397	29.83	2.040	0.040	f	f	0	f	128	1	-
## 398	398	23.58	0.585	0.125	f	f	0	f	120	87	-
## 399	399	26.17	12.500	1.250	f	f	0	t	0	17	-
## 400	400	31.00	2.085	0.085	f	f	0	f	300	0	-
## 401	401	20.75	5.085	0.290	f	f	0	f	140	184	-
## 402	402	28.92	0.375	0.290	f	f	0	f	220	140	-
## 403	403	51.92	6.500	3.085	f	f	0	t	73	0	-
## 404	404	22.67	0.335	0.750	f	f	0	f	160	0	-
## 405	405	34.00	5.085	1.085	f	f	0	t	480	0	-
## 406	406	69.50	6.000	0.000	f	f	0	f	0	0	-
## 407	407	40.33	8.125	0.165	f	t	2	f	NA	18	-
## 408	408	19.58	0.665	1.000	f	t	1	f	2000	2	-
## 409	409	16.00	3.125	0.085	f	t	1	f	0	6	-
## 410	410	17.08	0.250	0.335	f	t	4	f	160	8	-
## 411	411	31.25	2.835	0.000	f	t	5	f	176	146	-
## 412	412	25.17	3.000	1.250	f	t	1	f	0	22	-
## 413	413	22.67	0.790	0.085	f	f	0	f	144	0	-
## 414	414	40.58	1.500	0.000	f	f	0	f	300	0	-
## 415	415	22.25	0.460	0.125	f	f	0	t	280	55	-

## 416	416	22.25	1.250	3.250	f	f	0	f	280	0	-
## 417	417	22.50	0.125	0.125	f	f	0	f	200	70	-
## 418	418	23.58	1.790	0.540	f	f	0	t	136	1	-
## 419	419	38.42	0.705	0.375	f	t	2	f	225	500	-
## 420	420	26.58	2.540	0.000	f	f	0	t	180	60	-
## 421	421	35.00	2.500	1.000	f	f	0	t	210	0	-
## 422	422	20.42	1.085	1.500	f	f	0	f	108	7	-
## 423	423	29.42	1.250	1.750	f	f	0	f	200	0	-
## 424	424	26.17	0.835	1.165	f	f	0	f	100	0	-
## 425	425	33.67	2.165	1.500	f	f	0	f	120	0	-
## 426	426	24.58	1.250	0.250	f	f	0	f	110	0	-
## 427	427	27.67	2.040	0.250	f	f	0	t	180	50	-
## 428	428	37.50	0.835	0.040	f	f	0	f	120	5	-
## 429	429	49.17	2.290	0.290	f	f	0	f	200	3	-
## 430	430	33.58	0.335	0.085	f	f	0	f	180	0	-
## 431	431	51.83	3.000	1.500	f	f	0	f	180	4	-
## 432	432	22.92	3.165	0.165	f	f	0	f	160	1058	-
## 433	433	21.83	1.540	0.085	f	f	0	t	356	0	-
## 434	434	25.25	1.000	0.500	f	f	0	f	200	0	-
## 435	435	58.58	2.710	2.415	f	f	0	t	320	0	-
## 436	436	19.00	0.000	0.000	f	t	4	f	45	1	-
## 437	437	19.58	0.585	0.000	f	t	3	f	350	769	-
## 438	438	53.33	0.165	0.000	f	f	0	t	62	27	-
## 439	439	27.17	1.250	0.000	f	t	1	f	92	300	-
## 440	440	25.92	0.875	0.375	f	t	2	t	174	3	-
## 441	441	23.08	0.000	1.000	f	t	11	f	0	0	-
## 442	442	39.58	5.000	0.000	f	t	2	f	17	1	-
## 443	443	30.58	2.710	0.125	f	f	0	t	80	0	-
## 444	444	17.25	3.000	0.040	f	f	0	t	160	40	-
## 445	445	17.67	0.000	0.000	f	f	0	f	86	0	-
## 446	446	NA	11.250	0.000	f	f	0	f	NA	5200	-
## 447	447	16.50	0.125	0.165	f	f	0	f	132	0	-
## 448	448	27.33	1.665	0.000	f	f	0	f	340	1	-
## 449	449	31.25	1.125	0.000	f	t	1	f	96	19	-
## 450	450	20.00	7.000	0.500	f	f	0	f	0	0	-
## 451	451	NA	3.000	7.000	f	f	0	f	0	1	-
## 452	452	39.50	1.625	1.500	f	f	0	f	0	316	-
## 453	453	36.50	4.250	3.500	f	f	0	f	454	50	-
## 454	454	29.75	0.665	0.250	f	f	0	t	300	0	-
## 455	455	52.42	1.500	3.750	f	f	0	t	0	350	-
## 456	456	36.17	18.125	0.085	f	f	0	f	320	3552	-
## 457	457	34.58	0.000	0.000	f	f	0	f	NA	0	-
## 458	458	29.67	0.750	0.040	f	f	0	f	240	0	-
## 459	459	36.17	5.500	5.000	f	f	0	f	210	687	-
## 460	460	25.67	0.290	1.500	f	f	0	t	160	0	-
## 461	461	24.50	2.415	0.000	f	f	0	f	120	0	-
## 462	462	24.08	0.875	0.085	f	t	4	f	254	1950	-
## 463	463	21.92	0.500	0.125	f	f	0	f	360	0	-
## 464	464	36.58	0.290	0.000	f	t	10	f	200	18	-
## 465	465	23.00	1.835	0.000	f	t	1	f	200	53	-
## 466	466	27.58	3.000	2.790	f	t	1	t	280	10	-
## 467	467	31.08	3.085	2.500	f	t	2	t	160	41	-

## 468	468	30.42	1.375	0.040	f	t	3	f	0	33	-
## 469	469	22.08	2.335	0.750	f	f	0	f	180	0	-
## 470	470	16.33	4.085	0.415	f	f	0	t	120	0	-
## 471	471	21.92	11.665	0.085	f	f	0	f	320	5	-
## 472	472	21.08	4.125	0.040	f	f	0	f	140	100	-
## 473	473	17.42	6.500	0.125	f	f	0	f	60	100	-
## 474	474	19.17	4.000	1.000	f	f	0	t	360	1000	-
## 475	475	20.67	0.415	0.125	f	f	0	f	0	44	-
## 476	476	26.75	2.000	0.750	f	f	0	t	80	0	-
## 477	477	23.58	0.835	0.085	f	f	0	t	220	5	-
## 478	478	39.17	2.500	10.000	f	f	0	t	200	0	-
## 479	479	22.75	11.500	0.415	f	f	0	f	0	0	-
## 480	480	26.50	2.710	0.085	f	f	0	f	80	0	-
## 481	481	16.92	0.500	0.165	f	t	6	t	240	35	-
## 482	482	23.50	3.165	0.415	f	t	1	t	280	80	-
## 483	483	17.33	9.500	1.750	f	t	10	t	0	10	-
## 484	484	23.75	0.415	0.040	f	t	2	f	128	6	-
## 485	485	34.67	1.080	1.165	f	f	0	f	28	0	-
## 486	486	74.83	19.000	0.040	f	t	2	f	0	351	-
## 487	487	28.17	0.125	0.085	f	f	0	f	216	2100	-
## 488	488	24.50	13.335	0.040	f	f	0	t	120	475	-
## 489	489	18.83	3.540	0.000	f	f	0	t	180	1	-
## 490	490	45.33	1.000	0.125	f	f	0	t	263	0	-
## 491	491	47.25	0.750	2.750	t	t	1	f	333	892	+
## 492	492	24.17	0.875	4.625	t	t	2	t	520	2000	+
## 493	493	39.25	9.500	6.500	t	t	14	f	240	4607	+
## 494	494	20.50	11.835	6.000	t	f	0	f	340	0	+
## 495	495	18.83	4.415	3.000	t	f	0	f	240	0	+
## 496	496	19.17	9.500	1.500	t	f	0	f	120	2206	+
## 497	497	25.00	0.875	1.040	t	f	0	t	160	5860	+
## 498	498	20.17	9.250	1.665	t	t	3	t	40	28	+
## 499	499	25.75	0.500	1.460	t	t	5	t	312	0	+
## 500	500	20.42	7.000	1.625	t	t	3	f	200	1391	+
## 501	501	NA	4.000	5.000	t	t	3	t	290	2279	+
## 502	502	39.00	5.000	3.500	t	t	10	t	0	0	+
## 503	503	64.08	0.165	0.000	t	t	1	f	232	100	+
## 504	504	28.25	5.125	4.750	t	t	2	f	420	7	+
## 505	505	28.75	3.750	1.085	t	t	1	t	371	0	+
## 506	506	31.33	19.500	7.000	t	t	16	f	0	5000	+
## 507	507	18.92	9.000	0.750	t	t	2	f	88	591	+
## 508	508	24.75	3.000	1.835	t	t	19	f	0	500	+
## 509	509	30.67	12.000	2.000	t	t	1	f	220	19	+
## 510	510	21.00	4.790	2.250	t	t	1	t	80	300	+
## 511	511	13.75	4.000	1.750	t	t	2	t	120	1000	+
## 512	512	46.00	4.000	0.000	t	f	0	f	100	960	+
## 513	513	44.33	0.000	2.500	t	f	0	f	0	0	+
## 514	514	20.25	9.960	0.000	t	f	0	f	0	0	+
## 515	515	22.67	2.540	2.585	t	f	0	f	0	0	+
## 516	516	NA	10.500	6.500	t	f	0	f	0	0	+
## 517	517	60.92	5.000	4.000	t	t	4	f	0	99	+
## 518	518	16.08	0.750	1.750	t	t	5	t	352	690	+
## 519	519	28.17	0.375	0.585	t	t	4	f	80	0	+

## 520	520	39.17	1.710	0.125	t	t	5	t	480	0	+
## 521	521	20.42	7.500	1.500	t	t	1	f	160	234	+
## 522	522	30.00	5.290	2.250	t	t	5	t	99	500	+
## 523	523	22.83	3.000	1.290	t	t	1	f	260	800	+
## 524	524	22.50	8.500	1.750	t	t	10	f	80	990	-
## 525	525	28.58	1.665	2.415	t	f	0	t	440	0	-
## 526	526	45.17	1.500	2.500	t	f	0	t	140	0	-
## 527	527	41.58	1.750	0.210	t	f	0	f	160	0	-
## 528	528	57.08	0.335	1.000	t	f	0	t	252	2197	-
## 529	529	55.75	7.080	6.750	t	t	3	t	100	50	-
## 530	530	43.25	25.210	0.210	t	t	1	f	760	90	-
## 531	531	25.33	2.085	2.750	t	f	0	t	360	1	-
## 532	532	24.58	0.670	1.750	t	f	0	f	400	0	-
## 533	533	43.17	2.250	0.750	t	f	0	f	560	0	-
## 534	534	40.92	0.835	0.000	t	f	0	f	130	1	-
## 535	535	31.83	2.500	7.500	t	f	0	t	523	0	-
## 536	536	33.92	1.585	0.000	t	f	0	f	320	0	-
## 537	537	24.92	1.250	0.000	t	f	0	f	80	0	-
## 538	538	35.25	3.165	3.750	t	f	0	t	680	0	-
## 539	539	34.25	1.750	0.250	t	f	0	t	163	0	-
## 540	540	80.25	5.500	0.540	t	f	0	f	0	340	-
## 541	541	19.42	1.500	2.000	t	f	0	t	100	20	-
## 542	542	42.75	3.000	1.000	t	f	0	f	0	200	-
## 543	543	19.67	10.000	0.835	t	f	0	t	140	0	-
## 544	544	36.33	3.790	1.165	t	f	0	t	200	0	-
## 545	545	30.08	1.040	0.500	t	t	10	t	132	28	-
## 546	546	44.25	11.000	1.500	t	f	0	f	0	0	-
## 547	547	23.58	0.460	2.625	t	t	6	t	208	347	-
## 548	548	23.92	1.500	1.875	t	t	6	f	200	327	+
## 549	549	33.17	1.000	0.750	t	t	7	t	340	4071	+
## 550	550	48.33	12.000	16.000	t	f	0	f	110	0	+
## 551	551	76.75	22.290	12.750	t	t	1	t	0	109	+
## 552	552	51.33	10.000	0.000	t	t	11	f	0	1249	+
## 553	553	34.75	15.000	5.375	t	t	9	t	0	134	+
## 554	554	38.58	3.335	4.000	t	t	14	f	383	1344	+
## 555	555	22.42	11.250	0.750	t	t	4	f	0	321	+
## 556	556	41.92	0.420	0.210	t	t	6	f	220	948	+
## 557	557	29.58	4.500	7.500	t	t	2	t	330	0	+
## 558	558	32.17	1.460	1.085	t	t	16	f	120	2079	+
## 559	559	51.42	0.040	0.040	t	f	0	f	0	3000	+
## 560	560	22.83	2.290	2.290	t	t	7	t	140	2384	+
## 561	561	25.00	12.330	3.500	t	t	6	f	400	458	+
## 562	562	26.75	1.125	1.250	t	f	0	f	0	5298	+
## 563	563	23.33	1.500	1.415	t	f	0	f	422	200	+
## 564	564	24.42	12.335	1.585	t	f	0	t	120	0	+
## 565	565	42.17	5.040	12.750	t	f	0	t	92	0	+
## 566	566	20.83	3.000	0.040	t	f	0	f	100	0	+
## 567	567	23.08	11.500	2.125	t	t	11	t	290	284	+
## 568	568	25.17	2.875	0.875	t	f	0	f	360	0	+
## 569	569	43.08	0.375	0.375	t	t	8	t	300	162	+
## 570	570	35.75	0.915	0.750	t	t	4	f	0	1583	+
## 571	571	59.50	2.750	1.750	t	t	5	t	60	58	+

## 572	572	21.00	3.000	1.085	t	t	8	t	160	1	+
## 573	573	21.92	0.540	0.040	t	t	1	t	840	59	+
## 574	574	65.17	14.000	0.000	t	t	11	t	0	1400	+
## 575	575	20.33	10.000	1.000	t	t	4	f	50	1465	+
## 576	576	32.25	0.165	3.250	t	t	1	t	432	8000	+
## 577	577	30.17	0.500	1.750	t	t	11	f	32	540	+
## 578	578	25.17	6.000	1.000	t	t	3	f	0	0	+
## 579	579	39.17	1.625	1.500	t	t	10	f	186	4700	+
## 580	580	39.08	6.000	1.290	t	t	5	t	108	1097	+
## 581	581	31.67	0.830	1.335	t	t	8	t	303	3290	+
## 582	582	41.00	0.040	0.040	f	t	1	f	560	0	+
## 583	583	48.50	4.250	0.125	t	f	0	t	225	0	+
## 584	584	32.67	9.000	5.250	t	f	0	t	154	0	+
## 585	585	28.08	15.000	0.000	t	f	0	f	0	13212	+
## 586	586	73.42	17.750	0.000	t	f	0	t	0	0	+
## 587	587	64.08	20.000	17.500	t	t	9	t	0	1000	+
## 588	588	51.58	15.000	8.500	t	t	9	f	0	0	+
## 589	589	26.67	1.750	1.000	t	t	5	t	160	5777	+
## 590	590	25.33	0.580	0.290	t	t	7	t	96	5124	+
## 591	591	30.17	6.500	3.125	t	t	8	f	330	1200	+
## 592	592	27.00	0.750	4.250	t	t	3	t	312	150	+
## 593	593	23.17	0.000	0.000	f	f	0	f	NA	0	+
## 594	594	34.17	5.250	0.085	f	f	0	t	290	6	+
## 595	595	38.67	0.210	0.085	t	f	0	t	280	0	+
## 596	596	25.75	0.750	0.250	t	f	0	f	349	23	+
## 597	597	46.08	3.000	2.375	t	t	8	t	396	4159	+
## 598	598	21.50	6.000	2.500	t	t	3	f	80	918	+
## 599	599	20.08	0.125	1.000	f	t	1	f	240	768	+
## 600	600	20.50	2.415	2.000	t	t	11	t	200	3000	+
## 601	601	29.50	0.460	0.540	t	t	4	f	380	500	+
## 602	602	42.25	1.750	0.000	f	f	0	t	150	1	-
## 603	603	29.83	1.250	0.250	f	f	0	f	224	0	-
## 604	604	20.08	0.250	0.125	f	f	0	f	200	0	-
## 605	605	23.42	0.585	0.085	t	f	0	f	180	0	-
## 606	606	29.58	1.750	1.250	f	f	0	t	280	0	-
## 607	607	16.17	0.040	0.040	f	f	0	f	0	0	+
## 608	608	32.33	3.500	0.500	f	f	0	t	232	0	-
## 609	609	NA	0.040	4.250	f	f	0	t	460	0	-
## 610	610	47.83	4.165	0.085	f	f	0	t	520	0	-
## 611	611	20.00	1.250	0.125	f	f	0	f	140	4	-
## 612	612	27.58	3.250	5.085	f	t	2	t	369	1	-
## 613	613	22.00	0.790	0.290	f	t	1	f	420	283	-
## 614	614	19.33	10.915	0.585	f	t	2	t	200	7	-
## 615	615	38.33	4.415	0.125	f	f	0	f	160	0	-
## 616	616	29.42	1.250	0.250	f	t	2	t	400	108	-
## 617	617	22.67	0.750	1.585	f	t	1	t	400	9	-
## 618	618	32.25	14.000	0.000	f	t	2	f	160	1	-
## 619	619	29.58	4.750	2.000	f	t	1	t	460	68	-
## 620	620	18.42	10.415	0.125	t	f	0	f	120	375	-
## 621	621	22.17	2.250	0.125	f	f	0	f	160	10	-
## 622	622	22.67	0.165	2.250	f	f	0	t	0	0	+
## 623	623	25.58	0.000	0.000	f	f	0	f	NA	0	+

## 624	624	18.83	0.000	0.665	f	f	0	f	160	1	-
## 625	625	21.58	0.790	0.665	f	f	0	f	160	0	-
## 626	626	23.75	12.000	2.085	f	f	0	f	80	0	-
## 627	627	22.00	7.835	0.165	f	f	0	t	NA	0	-
## 628	628	36.08	2.540	0.000	f	f	0	f	0	1000	-
## 629	629	29.25	13.000	0.500	f	f	0	f	228	0	-
## 630	630	19.58	0.665	1.665	f	f	0	f	220	5	-
## 631	631	22.92	1.250	0.250	f	f	0	t	120	809	-
## 632	632	27.25	0.290	0.125	f	t	1	t	272	108	-
## 633	633	38.75	1.500	0.000	f	f	0	f	76	0	-
## 634	634	32.42	2.165	0.000	f	f	0	f	120	0	-
## 635	635	23.75	0.710	0.250	f	t	1	t	240	4	-
## 636	636	18.17	2.460	0.960	f	t	2	t	160	587	-
## 637	637	40.92	0.500	0.500	f	f	0	t	130	0	-
## 638	638	19.50	9.585	0.790	f	f	0	f	80	350	-
## 639	639	28.58	3.625	0.250	f	f	0	t	100	0	-
## 640	640	35.58	0.750	1.500	f	f	0	t	231	0	-
## 641	641	34.17	2.750	2.500	f	f	0	t	232	200	-
## 642	642	33.17	2.250	3.500	f	f	0	t	200	141	-
## 643	643	31.58	0.750	3.500	f	f	0	t	320	0	-
## 644	644	52.50	7.000	3.000	f	f	0	f	0	0	-
## 645	645	36.17	0.420	0.290	f	f	0	t	309	2	-
## 646	646	37.33	2.665	0.165	f	f	0	t	0	501	-
## 647	647	20.83	8.500	0.165	f	f	0	f	0	351	-
## 648	648	24.08	9.000	0.250	f	f	0	t	0	0	-
## 649	649	25.58	0.335	3.500	f	f	0	t	340	0	-
## 650	650	35.17	3.750	0.000	f	t	6	f	0	200	-
## 651	651	48.08	3.750	1.000	f	f	0	f	100	2	-
## 652	652	15.83	7.625	0.125	f	t	1	t	0	160	-
## 653	653	22.50	0.415	0.335	f	f	0	t	144	0	-
## 654	654	21.50	11.500	0.500	t	f	0	t	100	68	-
## 655	655	23.58	0.830	0.415	f	t	1	t	200	11	-
## 656	656	21.08	5.000	0.000	f	f	0	f	0	0	-
## 657	657	25.67	3.250	2.290	f	t	1	t	416	21	-
## 658	658	38.92	1.665	0.250	f	f	0	f	0	390	-
## 659	659	15.75	0.375	1.000	f	f	0	f	120	18	-
## 660	660	28.58	3.750	0.250	f	t	1	t	40	154	-
## 661	661	22.25	9.000	0.085	f	f	0	f	0	0	-
## 662	662	29.83	3.500	0.165	f	f	0	f	216	0	-
## 663	663	23.50	1.500	0.875	f	f	0	t	160	0	-
## 664	664	32.08	4.000	1.500	f	f	0	t	120	0	-
## 665	665	31.08	1.500	0.040	f	f	0	f	160	0	-
## 666	666	31.83	0.040	0.040	f	f	0	f	0	0	-
## 667	667	21.75	11.750	0.250	f	f	0	t	180	0	-
## 668	668	17.92	0.540	1.750	f	t	1	t	80	5	-
## 669	669	30.33	0.500	0.085	f	f	0	t	252	0	-
## 670	670	51.83	2.040	1.500	f	f	0	f	120	1	-
## 671	671	47.17	5.835	5.500	f	f	0	f	465	150	-
## 672	672	25.83	12.835	0.500	f	f	0	f	0	2	-
## 673	673	50.25	0.835	0.500	f	f	0	t	240	117	-
## 674	674	29.50	2.000	2.000	f	f	0	f	256	17	-
## 675	675	37.33	2.500	0.210	f	f	0	f	260	246	-

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## 676 676 41.58 1.040 0.665 f f 0 f 240 237 -
## 677 677 30.58 10.665 0.085 f t 12 t 129 3 -
## 678 678 19.42 7.250 0.040 f t 1 f 100 1 -
## 679 679 17.92 10.210 0.000 f f 0 f 0 50 -
## 680 680 20.08 1.250 0.000 f f 0 f 0 0 -
## 681 681 19.50 0.290 0.290 f f 0 f 280 364 -
## 682 682 27.83 1.000 3.000 f f 0 f 176 537 -
## 683 683 17.08 3.290 0.335 f f 0 t 140 2 -
## 684 684 36.42 0.750 0.585 f f 0 f 240 3 -
## 685 685 40.58 3.290 3.500 f f 0 t 400 0 -
## 686 686 21.08 10.085 1.250 f f 0 f 260 0 -
## 687 687 22.67 0.750 2.000 f t 2 t 200 394 -
## 688 688 25.25 13.500 2.000 f t 1 t 200 1 -
## 689 689 17.92 0.205 0.040 f f 0 f 280 750 -
## 690 690 35.00 3.375 8.290 f f 0 t 0 0 -
##      credit.score ages
## 1      664.60  58
## 2      693.88  54
## 3      621.82  62
## 4      653.97  51
## 5      670.26  58
## 6      672.16  37
## 7      693.53  47
## 8      697.57  67
## 9      704.22  61
## 10     722.97  62
## 11     677.64  41
## 12     675.62  51
## 13     657.88  51
## 14     717.00  32
## 15     741.70  51
## 16     600.64  59
## 17     712.13  49
## 18     682.23  49
## 19     652.96  46
## 20     733.69  55
## 21     664.53  58
## 22     710.16  43
## 23     695.52  43
## 24     662.91  47
## 25     736.13  43
## 26     590.82  63
## 27     677.87  51
## 28     623.93  45
## 29     675.94  40
## 30     787.31  49
## 31     705.56  38
## 32     771.17  52
## 33     653.67  54
## 34     663.27  42
## 35     753.83  45
## 36     664.91  62

```

## 37	680.70	50
## 38	730.97	57
## 39	660.98	43
## 40	653.45	59
## 41	628.75	39
## 42	697.67	36
## 43	717.06	61
## 44	697.27	48
## 45	697.62	58
## 46	653.99	61
## 47	635.95	57
## 48	737.76	50
## 49	712.99	48
## 50	684.82	55
## 51	719.12	35
## 52	727.22	45
## 53	714.25	49
## 54	743.68	41
## 55	738.52	51
## 56	633.10	43
## 57	736.88	44
## 58	681.92	35
## 59	647.96	54
## 60	766.69	57
## 61	705.03	52
## 62	765.37	54
## 63	635.55	35
## 64	739.70	35
## 65	637.83	60
## 66	690.23	45
## 67	687.44	54
## 68	709.75	42
## 69	632.59	32
## 70	744.27	46
## 71	657.94	52
## 72	674.26	52
## 73	689.36	58
## 74	723.65	56
## 75	714.43	53
## 76	693.65	52
## 77	655.94	55
## 78	786.51	44
## 79	782.81	51
## 80	657.55	50
## 81	705.86	52
## 82	713.99	52
## 83	754.96	54
## 84	752.21	50
## 85	780.52	54
## 86	742.09	54
## 87	677.58	44
## 88	666.99	36

## 89	752.67	51
## 90	659.90	48
## 91	672.47	40
## 92	738.33	39
## 93	699.88	71
## 94	687.46	55
## 95	753.72	36
## 96	756.46	50
## 97	738.47	84
## 98	723.07	49
## 99	609.08	61
## 100	731.63	71
## 101	665.84	44
## 102	673.01	31
## 103	678.56	40
## 104	650.48	56
## 105	692.04	80
## 106	724.12	49
## 107	659.13	58
## 108	744.20	55
## 109	738.78	45
## 110	624.49	58
## 111	733.08	53
## 112	741.71	56
## 113	725.87	52
## 114	752.45	64
## 115	720.82	34
## 116	754.25	55
## 117	666.90	48
## 118	689.09	69
## 119	678.87	56
## 120	736.15	51
## 121	609.25	29
## 122	666.26	61
## 123	705.50	51
## 124	661.53	43
## 125	683.63	51
## 126	761.67	59
## 127	740.73	52
## 128	748.52	41
## 129	645.12	36
## 130	624.72	45
## 131	756.49	25
## 132	698.45	52
## 133	717.23	47
## 134	696.89	44
## 135	695.76	42
## 136	759.31	43
## 137	681.12	44
## 138	632.24	58
## 139	677.64	35
## 140	706.39	30

## 141	728.74	55
## 142	695.54	34
## 143	682.69	63
## 144	715.91	44
## 145	736.56	41
## 146	636.93	51
## 147	705.10	57
## 148	661.20	50
## 149	675.80	33
## 150	658.80	29
## 151	676.96	53
## 152	732.79	74
## 153	670.67	47
## 154	654.72	51
## 155	691.07	74
## 156	735.64	42
## 157	682.50	45
## 158	660.49	41
## 159	709.89	52
## 160	686.50	57
## 161	708.23	36
## 162	620.56	58
## 163	710.83	43
## 164	741.86	58
## 165	676.04	50
## 166	782.78	50
## 167	710.69	46
## 168	674.92	46
## 169	705.31	50
## 170	745.20	49
## 171	680.30	58
## 172	689.42	40
## 173	708.54	39
## 174	795.11	43
## 175	705.02	43
## 176	723.90	49
## 177	722.09	41
## 178	730.63	46
## 179	721.27	55
## 180	740.63	56
## 181	716.05	59
## 182	661.43	62
## 183	673.00	57
## 184	764.06	37
## 185	663.21	52
## 186	757.55	48
## 187	675.67	37
## 188	646.45	66
## 189	654.09	37
## 190	685.16	48
## 191	678.92	47
## 192	724.70	47

## 193	708.78	64
## 194	693.73	45
## 195	741.40	47
## 196	671.45	46
## 197	677.74	55
## 198	772.16	44
## 199	632.39	54
## 200	800.20	53
## 201	717.80	43
## 202	659.42	46
## 203	729.35	41
## 204	805.80	55
## 205	708.24	43
## 206	661.58	39
## 207	647.30	55
## 208	668.30	62
## 209	619.35	30
## 210	669.80	27
## 211	666.28	47
## 212	613.53	29
## 213	664.64	43
## 214	717.74	55
## 215	744.19	47
## 216	659.63	49
## 217	742.60	50
## 218	744.73	38
## 219	669.11	47
## 220	665.84	57
## 221	678.73	46
## 222	754.94	61
## 223	675.26	41
## 224	701.05	54
## 225	682.52	50
## 226	694.52	43
## 227	694.52	50
## 228	720.46	41
## 229	715.79	50
## 230	732.68	58
## 231	684.33	34
## 232	687.48	29
## 233	679.58	37
## 234	719.72	25
## 235	706.22	31
## 236	681.79	33
## 237	666.40	22
## 238	714.98	26
## 239	608.79	33
## 240	714.65	36
## 241	681.09	40
## 242	698.73	32
## 243	751.47	34
## 244	685.64	27

## 245	732.72	27
## 246	730.42	33
## 247	701.81	29
## 248	670.88	35
## 249	712.38	24
## 250	697.48	20
## 251	757.73	26
## 252	718.59	31
## 253	689.85	29
## 254	633.78	25
## 255	703.11	22
## 256	668.75	33
## 257	703.67	25
## 258	705.15	28
## 259	756.44	33
## 260	749.76	34
## 261	756.91	27
## 262	777.81	31
## 263	638.42	35
## 264	737.34	24
## 265	602.25	38
## 266	724.94	26
## 267	697.30	38
## 268	726.42	30
## 269	689.55	24
## 270	725.24	24
## 271	721.43	30
## 272	700.60	38
## 273	681.72	32
## 274	709.70	29
## 275	629.06	27
## 276	623.01	30
## 277	636.16	26
## 278	725.84	30
## 279	778.61	25
## 280	708.89	19
## 281	703.04	32
## 282	723.29	34
## 283	709.51	38
## 284	677.82	29
## 285	701.96	28
## 286	639.93	21
## 287	706.52	21
## 288	640.93	27
## 289	710.92	24
## 290	662.12	32
## 291	704.88	25
## 292	671.72	33
## 293	683.70	33
## 294	635.99	27
## 295	737.29	19
## 296	775.90	32

## 297	684.19	36
## 298	715.39	30
## 299	752.31	25
## 300	643.53	27
## 301	707.03	36
## 302	675.67	29
## 303	750.69	30
## 304	647.66	32
## 305	701.99	29
## 306	701.41	31
## 307	756.91	31
## 308	764.74	34
## 309	680.22	45
## 310	785.93	30
## 311	643.94	30
## 312	638.40	35
## 313	688.48	21
## 314	716.49	32
## 315	684.57	20
## 316	726.66	24
## 317	732.19	21
## 318	640.13	28
## 319	682.62	39
## 320	690.65	27
## 321	761.11	29
## 322	748.60	34
## 323	690.02	34
## 324	706.16	34
## 325	645.63	28
## 326	683.36	36
## 327	731.82	31
## 328	752.94	30
## 329	652.34	34
## 330	653.67	24
## 331	630.27	28
## 332	613.17	28
## 333	710.83	23
## 334	647.33	27
## 335	654.21	21
## 336	656.39	27
## 337	714.54	35
## 338	767.85	29
## 339	701.62	29
## 340	721.38	31
## 341	725.67	32
## 342	667.49	18
## 343	749.12	32
## 344	707.74	30
## 345	670.47	23
## 346	732.51	30
## 347	662.62	39
## 348	644.13	32

## 349	654.02	27
## 350	676.13	27
## 351	648.50	33
## 352	666.18	42
## 353	740.06	25
## 354	655.76	32
## 355	718.97	27
## 356	732.03	26
## 357	694.92	26
## 358	675.90	35
## 359	620.84	29
## 360	767.48	24
## 361	692.02	25
## 362	687.86	27
## 363	723.53	28
## 364	629.57	31
## 365	752.37	25
## 366	667.97	31
## 367	658.14	30
## 368	694.54	27
## 369	759.43	24
## 370	706.41	32
## 371	710.53	23
## 372	585.14	31
## 373	683.31	39
## 374	694.34	32
## 375	701.12	28
## 376	718.98	29
## 377	674.55	28
## 378	749.52	29
## 379	699.87	35
## 380	684.44	34
## 381	733.55	17
## 382	761.79	32
## 383	618.94	27
## 384	690.88	25
## 385	670.79	30
## 386	714.83	26
## 387	711.58	27
## 388	631.71	33
## 389	710.04	21
## 390	718.00	36
## 391	708.19	28
## 392	730.30	36
## 393	706.53	30
## 394	673.50	28
## 395	730.09	31
## 396	652.94	26
## 397	700.50	33
## 398	647.59	33
## 399	697.35	25
## 400	707.79	34

## 401	735.25	34
## 402	682.19	34
## 403	643.69	33
## 404	692.53	23
## 405	788.35	27
## 406	742.79	30
## 407	682.31	31
## 408	732.32	45
## 409	685.33	33
## 410	749.92	23
## 411	710.23	34
## 412	707.24	31
## 413	758.95	29
## 414	759.04	30
## 415	685.01	28
## 416	661.75	29
## 417	700.05	26
## 418	625.21	33
## 419	680.94	35
## 420	688.05	36
## 421	726.57	28
## 422	589.38	39
## 423	646.99	31
## 424	644.55	24
## 425	689.79	26
## 426	623.27	30
## 427	699.28	34
## 428	666.80	39
## 429	721.09	26
## 430	659.59	30
## 431	643.38	34
## 432	715.74	34
## 433	732.38	31
## 434	686.87	31
## 435	721.87	33
## 436	707.45	33
## 437	762.83	36
## 438	706.23	26
## 439	677.95	24
## 440	700.14	33
## 441	741.25	32
## 442	738.35	31
## 443	649.06	32
## 444	646.84	26
## 445	747.29	29
## 446	748.25	29
## 447	731.50	33
## 448	727.37	26
## 449	695.58	27
## 450	697.34	32
## 451	754.04	39
## 452	721.21	29

## 453	678.22	27
## 454	739.34	32
## 455	660.62	29
## 456	693.81	27
## 457	680.82	34
## 458	754.07	27
## 459	680.91	36
## 460	672.65	28
## 461	628.15	27
## 462	693.81	48
## 463	684.18	44
## 464	732.12	54
## 465	719.20	30
## 466	738.20	44
## 467	666.36	38
## 468	660.74	41
## 469	631.25	38
## 470	688.58	43
## 471	640.83	42
## 472	653.12	46
## 473	714.42	34
## 474	702.47	51
## 475	746.66	37
## 476	663.50	48
## 477	715.85	43
## 478	634.16	40
## 479	720.97	44
## 480	773.79	40
## 481	669.02	36
## 482	674.05	37
## 483	663.82	34
## 484	709.00	40
## 485	675.72	33
## 486	778.14	41
## 487	713.02	49
## 488	737.05	35
## 489	711.90	38
## 490	747.00	32
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## 492	731.01	38
## 493	683.37	41
## 494	796.09	42
## 495	733.32	43
## 496	691.96	27
## 497	729.50	47
## 498	754.33	37
## 499	630.35	46
## 500	678.05	44
## 501	701.82	30
## 502	691.04	36
## 503	726.14	53
## 504	707.81	43

## 505	708.95	32
## 506	700.18	34
## 507	703.94	45
## 508	686.17	32
## 509	665.63	29
## 510	716.44	40
## 511	633.46	35
## 512	651.88	42
## 513	719.46	31
## 514	691.24	34
## 515	692.70	40
## 516	673.82	24
## 517	758.99	49
## 518	694.06	53
## 519	771.29	36
## 520	600.21	32
## 521	664.23	37
## 522	680.73	47
## 523	650.67	39
## 524	742.43	54
## 525	673.73	32
## 526	693.72	34
## 527	673.69	36
## 528	706.96	36
## 529	723.76	53
## 530	694.58	50
## 531	653.77	36
## 532	677.41	57
## 533	683.43	52
## 534	749.74	32
## 535	632.90	53
## 536	701.81	47
## 537	689.90	22
## 538	619.55	49
## 539	728.90	45
## 540	673.59	36
## 541	698.64	40
## 542	620.93	31
## 543	641.27	51
## 544	717.31	40
## 545	749.40	45
## 546	703.28	39
## 547	706.05	43
## 548	705.23	33
## 549	659.98	33
## 550	757.56	49
## 551	618.21	43
## 552	713.79	56
## 553	652.62	47
## 554	670.44	42
## 555	737.92	39
## 556	676.07	43

## 557	743.75	45
## 558	695.69	40
## 559	703.03	59
## 560	711.69	29
## 561	738.63	30
## 562	655.44	41
## 563	708.79	42
## 564	721.91	44
## 565	727.57	47
## 566	642.33	22
## 567	649.75	24
## 568	698.62	47
## 569	695.54	62
## 570	717.05	49
## 571	731.06	42
## 572	779.41	39
## 573	671.54	34
## 574	806.00	44
## 575	627.07	47
## 576	777.26	34
## 577	666.73	45
## 578	696.26	44
## 579	633.85	45
## 580	736.95	43
## 581	700.81	44
## 582	766.74	37
## 583	629.41	29
## 584	720.34	42
## 585	706.43	44
## 586	760.91	26
## 587	700.05	44
## 588	726.16	53
## 589	671.21	46
## 590	753.07	34
## 591	681.81	45
## 592	661.55	25
## 593	681.89	46
## 594	721.15	38
## 595	703.70	37
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## 597	684.49	46
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## 599	719.97	36
## 600	646.00	40
## 601	698.71	42
## 602	744.89	42
## 603	635.32	37
## 604	660.73	38
## 605	703.71	34
## 606	658.95	32
## 607	670.27	36
## 608	685.63	39

## 609	787.79	44
## 610	788.98	44
## 611	704.57	32
## 612	671.63	37
## 613	698.61	45
## 614	661.24	42
## 615	736.05	57
## 616	629.05	33
## 617	696.53	42
## 618	607.17	32
## 619	649.92	52
## 620	667.30	34
## 621	703.48	47
## 622	662.74	42
## 623	703.16	45
## 624	704.50	39
## 625	720.67	43
## 626	669.83	49
## 627	583.66	34
## 628	662.45	39
## 629	736.86	40
## 630	648.24	45
## 631	674.65	42
## 632	746.58	39
## 633	712.51	37
## 634	690.65	26
## 635	682.26	26
## 636	721.09	40
## 637	649.36	49
## 638	662.45	30
## 639	625.58	34
## 640	681.78	43
## 641	633.40	40
## 642	591.78	33
## 643	691.87	41
## 644	758.32	44
## 645	730.89	28
## 646	662.92	37
## 647	672.00	38
## 648	655.46	30
## 649	754.29	37
## 650	763.84	33
## 651	601.94	48
## 652	701.98	43
## 653	728.29	36
## 654	785.06	31
## 655	730.85	33
## 656	651.92	28
## 657	676.35	49
## 658	721.55	45
## 659	667.67	41
## 660	677.12	35

## 661	637.08	49
## 662	750.92	39
## 663	667.10	36
## 664	713.45	36
## 665	644.80	38
## 666	740.15	38
## 667	743.55	29
## 668	675.32	40
## 669	680.54	33
## 670	635.72	43
## 671	753.56	31
## 672	592.29	47
## 673	706.14	27
## 674	660.98	46
## 675	729.96	34
## 676	722.24	40
## 677	740.84	43
## 678	702.05	36
## 679	628.38	35
## 680	745.54	35
## 681	689.77	39
## 682	758.88	48
## 683	752.54	38
## 684	682.87	41
## 685	656.14	25
## 686	736.22	36
## 687	643.56	32
## 688	665.36	38
## 689	716.15	35
## 690	739.94	45

```
# Remove the "ID" column
data1 <- data[, -1]
data1
```

	##	cont1	cont2	cont3	bool1	bool2	cont4	bool3	cont5	cont6	approval
## 1	30.83	0.000	1.250	t	t	1	f	202	0		+
## 2	58.67	4.460	3.040	t	t	6	f	43	560		+
## 3	24.50	0.500	1.500	t	f	0	f	280	824		+
## 4	27.83	1.540	3.750	t	t	5	t	100	3		+
## 5	20.17	5.625	1.710	t	f	0	f	120	0		+
## 6	32.08	4.000	2.500	t	f	0	t	360	0		+
## 7	33.17	1.040	6.500	t	f	0	t	164	31285		+
## 8	22.92	11.585	0.040	t	f	0	f	80	1349		+
## 9	54.42	0.500	3.960	t	f	0	f	180	314		+
## 10	42.50	4.915	3.165	t	f	0	t	52	1442		+
## 11	22.08	0.830	2.165	f	f	0	t	128	0		+
## 12	29.92	1.835	4.335	t	f	0	f	260	200		+
## 13	38.25	6.000	1.000	t	f	0	t	0	0		+
## 14	48.08	6.040	0.040	f	f	0	f	0	2690		+
## 15	45.83	10.500	5.000	t	t	7	t	0	0		+
## 16	36.67	4.415	0.250	t	t	10	t	320	0		+
## 17	28.25	0.875	0.960	t	t	3	t	396	0		+
## 18	23.25	5.875	3.170	t	t	10	f	120	245		+
## 19	21.83	0.250	0.665	t	f	0	t	0	0		+
## 20	19.17	8.585	0.750	t	t	7	f	96	0		+
## 21	25.00	11.250	2.500	t	t	17	f	200	1208		+
## 22	23.25	1.000	0.835	t	f	0	f	300	0		+
## 23	47.75	8.000	7.875	t	t	6	t	0	1260		+
## 24	27.42	14.500	3.085	t	t	1	f	120	11		+
## 25	41.17	6.500	0.500	t	t	3	t	145	0		+
## 26	15.83	0.585	1.500	t	t	2	f	100	0		+
## 27	47.00	13.000	5.165	t	t	9	t	0	0		+
## 28	56.58	18.500	15.000	t	t	17	t	0	0		+
## 29	57.42	8.500	7.000	t	t	3	f	0	0		+
## 30	42.08	1.040	5.000	t	t	6	t	500	10000		+
## 31	29.25	14.790	5.040	t	t	5	t	168	0		+
## 32	42.00	9.790	7.960	t	t	8	f	0	0		+
## 33	49.50	7.585	7.585	t	t	15	t	0	5000		+
## 34	36.75	5.125	5.000	t	f	0	t	0	4000		+
## 35	22.58	10.750	0.415	t	t	5	t	0	560		+
## 36	27.83	1.500	2.000	t	t	11	t	434	35		+
## 37	27.25	1.585	1.835	t	t	12	t	583	713		+
## 38	23.00	11.750	0.500	t	t	2	t	300	551		+
## 39	27.75	0.585	0.250	t	t	2	f	260	500		+
## 40	54.58	9.415	14.415	t	t	11	t	30	300		+
## 41	34.17	9.170	4.500	t	t	12	t	0	221		+
## 42	28.92	15.000	5.335	t	t	11	f	0	2283		+
## 43	29.67	1.415	0.750	t	t	1	f	240	100		+
## 44	39.58	13.915	8.625	t	t	6	t	70	0		+
## 45	56.42	28.000	28.500	t	t	40	f	0	15		+
## 46	54.33	6.750	2.625	t	t	11	t	0	284		+
## 47	41.00	2.040	0.125	t	t	23	t	455	1236		+
## 48	31.92	4.460	6.040	t	t	3	f	311	300		+
## 49	41.50	1.540	3.500	f	f	0	f	216	0		+
## 50	23.92	0.665	0.165	f	f	0	f	100	0		+
## 51	25.75	0.500	0.875	t	f	0	t	491	0		+

## 52	26.00	1.000	1.750	t	f	0	t	280	0	+
## 53	37.42	2.040	0.040	t	f	0	t	400	5800	+
## 54	34.92	2.500	0.000	t	f	0	t	239	200	+
## 55	34.25	3.000	7.415	t	f	0	t	0	0	+
## 56	23.33	11.625	0.835	t	f	0	t	160	300	+
## 57	23.17	0.000	0.085	t	f	0	f	0	0	+
## 58	44.33	0.500	5.000	t	f	0	t	320	0	+
## 59	35.17	4.500	5.750	f	f	0	t	711	0	+
## 60	43.25	3.000	6.000	t	t	11	f	80	0	+
## 61	56.75	12.250	1.250	t	t	4	t	200	0	+
## 62	31.67	16.165	3.000	t	t	9	f	250	730	+
## 63	23.42	0.790	1.500	t	t	2	t	80	400	+
## 64	20.42	0.835	1.585	t	t	1	f	0	0	+
## 65	26.67	4.250	4.290	t	t	1	t	120	0	+
## 66	34.17	1.540	1.540	t	t	1	t	520	50000	+
## 67	36.00	1.000	2.000	t	t	11	f	0	456	+
## 68	25.50	0.375	0.250	t	t	3	f	260	15108	+
## 69	19.42	6.500	1.460	t	t	7	f	80	2954	+
## 70	35.17	25.125	1.625	t	t	1	t	515	500	+
## 71	32.33	7.500	1.585	t	f	0	t	420	0	-
## 72	34.83	4.000	12.500	t	f	0	t	NA	0	-
## 73	38.58	5.000	13.500	t	f	0	t	980	0	-
## 74	44.25	0.500	10.750	t	f	0	f	400	0	-
## 75	44.83	7.000	1.625	f	f	0	f	160	2	-
## 76	20.67	5.290	0.375	t	t	1	f	160	0	-
## 77	34.08	6.500	0.125	t	f	0	t	443	0	-
## 78	19.17	0.585	0.585	t	f	0	t	160	0	-
## 79	21.67	1.165	2.500	t	t	1	f	180	20	-
## 80	21.50	9.750	0.250	t	f	0	f	140	0	-
## 81	49.58	19.000	0.000	t	t	1	f	94	0	-
## 82	27.67	1.500	2.000	t	f	0	f	368	0	-
## 83	39.83	0.500	0.250	t	f	0	f	288	0	-
## 84	NA	3.500	3.000	t	f	0	t	300	0	-
## 85	27.25	0.625	0.455	t	f	0	t	200	0	-
## 86	37.17	4.000	5.000	t	f	0	t	280	0	-
## 87	NA	0.375	0.875	t	f	0	t	928	0	-
## 88	25.67	2.210	4.000	t	f	0	f	188	0	-
## 89	34.00	4.500	1.000	t	f	0	t	240	0	-
## 90	49.00	1.500	0.000	t	f	0	t	100	27	-
## 91	62.50	12.750	5.000	t	f	0	f	112	0	-
## 92	31.42	15.500	0.500	t	f	0	f	120	0	-
## 93	NA	5.000	8.500	t	f	0	f	0	0	-
## 94	52.33	1.375	9.460	t	f	0	t	200	100	-
## 95	28.75	1.500	1.500	t	f	0	t	0	225	-
## 96	28.58	3.540	0.500	t	f	0	t	171	0	-
## 97	23.00	0.625	0.125	t	f	0	f	180	1	-
## 98	NA	0.500	0.835	t	f	0	t	320	0	-
## 99	22.50	11.000	3.000	t	f	0	t	268	0	-
## 100	28.50	1.000	1.000	t	t	2	t	167	500	-
## 101	37.50	1.750	0.250	t	f	0	t	164	400	-
## 102	35.25	16.500	4.000	t	f	0	f	80	0	-
## 103	18.67	5.000	0.375	t	t	2	f	0	38	-

## 104	25.00	12.000	2.250	t	t	2	t	120	5	-
## 105	27.83	4.000	5.750	t	t	2	t	75	0	-
## 106	54.83	15.500	0.000	t	t	20	f	152	130	-
## 107	28.75	1.165	0.500	t	f	0	f	280	0	-
## 108	25.00	11.000	4.500	t	f	0	f	120	0	-
## 109	40.92	2.250	10.000	t	f	0	t	176	0	-
## 110	19.75	0.750	0.795	t	t	5	t	140	5	-
## 111	29.17	3.500	3.500	t	t	3	t	329	0	-
## 112	24.50	1.040	0.500	t	t	3	f	180	147	-
## 113	24.58	12.500	0.875	t	f	0	t	260	0	-
## 114	33.75	0.750	1.000	t	t	3	t	212	0	-
## 115	20.67	1.250	1.375	t	t	3	t	140	210	-
## 116	25.42	1.125	1.290	t	t	2	f	200	0	-
## 117	37.75	7.000	11.500	t	t	7	t	300	5	-
## 118	52.50	6.500	6.290	t	t	15	f	0	11202	+
## 119	57.83	7.040	14.000	t	t	6	t	360	1332	+
## 120	20.75	10.335	0.335	t	t	1	t	80	50	+
## 121	39.92	6.210	0.040	t	t	1	f	200	300	+
## 122	25.67	12.500	1.210	t	t	67	t	140	258	+
## 123	24.75	12.500	1.500	t	t	12	t	120	567	+
## 124	44.17	6.665	7.375	t	t	3	t	0	0	+
## 125	23.50	9.000	8.500	t	t	5	t	120	0	+
## 126	34.92	5.000	7.500	t	t	6	t	0	1000	+
## 127	47.67	2.500	2.500	t	t	12	t	410	2510	+
## 128	22.75	11.000	2.500	t	t	7	t	100	809	+
## 129	34.42	4.250	3.250	t	t	2	f	274	610	+
## 130	28.42	3.500	0.835	t	f	0	f	280	0	+
## 131	67.75	5.500	13.000	t	t	1	t	0	0	+
## 132	20.42	1.835	2.250	t	t	1	f	100	150	+
## 133	47.42	8.000	6.500	t	t	6	f	375	51100	+
## 134	36.25	5.000	2.500	t	t	6	f	0	367	+
## 135	32.67	5.500	5.500	t	t	12	t	408	1000	+
## 136	48.58	6.500	6.000	t	f	0	t	350	0	+
## 137	39.92	0.540	0.500	t	t	3	f	200	1000	+
## 138	33.58	2.750	4.250	t	t	6	f	204	0	+
## 139	18.83	9.500	1.625	t	t	6	t	40	600	+
## 140	26.92	13.500	5.000	t	t	2	f	0	5000	+
## 141	31.25	3.750	0.625	t	t	9	t	181	0	+
## 142	56.50	16.000	0.000	t	t	15	f	0	247	+
## 143	43.00	0.290	1.750	t	t	8	f	100	375	+
## 144	22.33	11.000	2.000	t	t	1	f	80	278	+
## 145	27.25	1.665	5.085	t	t	9	f	399	827	+
## 146	32.83	2.500	2.750	t	t	6	f	160	2072	+
## 147	23.25	1.500	2.375	t	t	3	t	0	582	+
## 148	40.33	7.540	8.000	t	t	14	f	0	2300	+
## 149	30.50	6.500	4.000	t	t	7	t	0	3065	+
## 150	52.83	15.000	5.500	t	t	14	f	0	2200	+
## 151	46.67	0.460	0.415	t	t	11	t	440	6	+
## 152	58.33	10.000	4.000	t	t	14	f	0	1602	+
## 153	37.33	6.500	4.250	t	t	12	t	93	0	+
## 154	23.08	2.500	1.085	t	t	11	t	60	2184	+
## 155	32.75	1.500	5.500	t	t	3	t	0	0	+

## 156	21.67	11.500	0.000	t	t	11	t	0	0	+
## 157	28.50	3.040	2.540	t	t	1	f	70	0	+
## 158	68.67	15.000	0.000	t	t	14	f	0	3376	+
## 159	28.00	2.000	4.165	t	t	2	t	181	0	+
## 160	34.08	0.080	0.040	t	t	1	t	280	2000	+
## 161	27.67	2.000	1.000	t	t	4	f	140	7544	+
## 162	44.00	2.000	1.750	t	t	2	t	0	15	+
## 163	25.08	1.710	1.665	t	t	1	t	395	20	+
## 164	32.00	1.750	0.040	t	f	0	t	393	0	+
## 165	60.58	16.500	11.000	t	f	0	t	21	10561	+
## 166	40.83	10.000	1.750	t	f	0	f	29	837	+
## 167	19.33	9.500	1.000	t	f	0	t	60	400	+
## 168	32.33	0.540	0.040	t	f	0	f	440	11177	+
## 169	36.67	3.250	9.000	t	f	0	t	102	639	+
## 170	37.50	1.125	1.500	f	f	0	t	431	0	+
## 171	25.08	2.540	0.250	t	f	0	t	370	0	+
## 172	41.33	0.000	15.000	t	f	0	f	0	0	+
## 173	56.00	12.500	8.000	t	f	0	t	24	2028	+
## 174	49.83	13.585	8.500	t	f	0	t	0	0	+
## 175	22.67	10.500	1.335	t	f	0	f	100	0	+
## 176	27.00	1.500	0.375	t	f	0	t	260	1065	+
## 177	25.00	12.500	3.000	t	f	0	t	20	0	+
## 178	26.08	8.665	1.415	t	f	0	f	160	150	+
## 179	18.42	9.250	1.210	t	t	4	f	60	540	+
## 180	20.17	8.170	1.960	t	t	14	f	60	158	+
## 181	47.67	0.290	15.000	t	t	20	f	0	15000	+
## 182	21.25	2.335	0.500	t	t	4	f	80	0	+
## 183	20.67	3.000	0.165	t	t	3	f	100	6	+
## 184	57.08	19.500	5.500	t	t	7	f	0	3000	+
## 185	22.42	5.665	2.585	t	t	7	f	129	3257	+
## 186	48.75	8.500	12.500	t	t	9	f	181	1655	+
## 187	40.00	6.500	3.500	t	t	1	f	0	500	+
## 188	40.58	5.000	5.000	t	t	7	f	0	3065	+
## 189	28.67	1.040	2.500	t	t	5	t	300	1430	+
## 190	33.08	4.625	1.625	t	t	2	f	0	0	+
## 191	21.33	10.500	3.000	t	f	0	t	0	0	+
## 192	42.00	0.205	5.125	t	f	0	f	400	0	+
## 193	41.75	0.960	2.500	t	f	0	f	510	600	+
## 194	22.67	1.585	3.085	t	t	6	f	80	0	+
## 195	34.50	4.040	8.500	t	t	7	t	195	0	+
## 196	28.25	5.040	1.500	t	t	8	t	144	7	+
## 197	33.17	3.165	3.165	t	t	3	t	380	0	+
## 198	48.17	7.625	15.500	t	t	12	f	0	790	+
## 199	27.58	2.040	2.000	t	t	3	t	370	560	+
## 200	22.58	10.040	0.040	t	t	9	f	60	396	+
## 201	24.08	0.500	1.250	t	t	1	f	0	678	+
## 202	41.33	1.000	2.250	t	f	0	t	0	300	+
## 203	24.83	2.750	2.250	t	t	6	f	NA	600	+
## 204	20.75	10.250	0.710	t	t	2	t	49	0	+
## 205	36.33	2.125	0.085	t	t	1	f	50	1187	+
## 206	35.42	12.000	14.000	t	t	8	f	0	6590	+
## 207	71.58	0.000	0.000	f	f	0	f	NA	0	+

## 208	28.67	9.335	5.665	t	t	6	f	381	168	+
## 209	35.17	2.500	4.500	t	t	7	f	150	1270	+
## 210	39.50	4.250	6.500	t	t	16	f	117	1210	+
## 211	39.33	5.875	10.000	t	t	14	t	399	0	+
## 212	24.33	6.625	5.500	t	f	0	t	100	0	+
## 213	60.08	14.500	18.000	t	t	15	t	0	1000	+
## 214	23.08	11.500	3.500	t	t	9	f	56	742	+
## 215	26.67	2.710	5.250	t	t	1	f	211	0	+
## 216	48.17	3.500	3.500	t	f	0	f	230	0	+
## 217	41.17	4.040	7.000	t	t	8	f	320	0	+
## 218	55.92	11.500	5.000	t	t	5	f	0	8851	+
## 219	53.92	9.625	8.665	t	t	5	f	0	0	+
## 220	18.92	9.250	1.000	t	t	4	t	80	500	+
## 221	50.08	12.540	2.290	t	t	3	t	156	0	+
## 222	65.42	11.000	20.000	t	t	7	t	22	0	+
## 223	17.58	9.000	1.375	t	f	0	t	0	0	+
## 224	18.83	9.540	0.085	t	f	0	f	100	0	+
## 225	37.75	5.500	0.125	t	f	0	t	228	0	+
## 226	23.25	4.000	0.250	t	f	0	t	160	0	+
## 227	18.08	5.500	0.500	t	f	0	f	80	0	+
## 228	22.50	8.460	2.460	f	f	0	f	164	0	+
## 229	19.67	0.375	2.000	t	t	2	t	80	0	+
## 230	22.08	11.000	0.665	t	f	0	f	100	0	+
## 231	25.17	3.500	0.625	t	t	7	f	0	7059	+
## 232	47.42	3.000	13.875	t	t	2	t	519	1704	+
## 233	33.50	1.750	4.500	t	t	4	t	253	857	+
## 234	27.67	13.750	5.750	t	f	0	t	487	500	+
## 235	58.42	21.000	10.000	t	t	13	f	0	6700	+
## 236	20.67	1.835	2.085	t	t	5	f	220	2503	+
## 237	26.17	0.250	0.000	t	f	0	t	0	0	+
## 238	21.33	7.500	1.415	t	t	1	f	80	9800	+
## 239	42.83	4.625	4.580	t	f	0	f	0	0	+
## 240	38.17	10.125	2.500	t	t	6	f	520	196	+
## 241	20.50	10.000	2.500	t	f	0	f	40	0	+
## 242	48.25	25.085	1.750	t	t	3	f	120	14	+
## 243	28.33	5.000	11.000	t	f	0	t	70	0	+
## 244	18.75	7.500	2.710	t	t	5	f	NA	26726	+
## 245	18.50	2.000	1.500	t	t	2	f	120	300	+
## 246	33.17	3.040	2.040	t	t	1	t	180	18027	+
## 247	45.00	8.500	14.000	t	t	1	t	88	2000	+
## 248	19.67	0.210	0.290	t	t	11	f	80	99	+
## 249	24.50	12.750	4.750	t	t	2	f	73	444	+
## 250	21.83	11.000	0.290	t	t	6	f	121	0	+
## 251	40.25	21.500	20.000	t	t	11	f	0	1200	+
## 252	41.42	5.000	5.000	t	t	6	t	470	0	+
## 253	17.83	11.000	1.000	t	t	11	f	0	3000	+
## 254	23.17	11.125	0.460	t	t	1	f	100	0	+
## 255	NA	0.625	0.250	f	f	0	f	380	2010	-
## 256	18.17	10.250	1.085	f	f	0	f	320	13	-
## 257	20.00	11.045	2.000	f	f	0	t	136	0	-
## 258	20.00	0.000	0.500	f	f	0	f	144	0	-
## 259	20.75	9.540	0.040	f	f	0	f	200	1000	-

## 260	24.50	1.750	0.165	f	f	0	f	132	0	-
## 261	32.75	2.335	5.750	f	f	0	t	292	0	-
## 262	52.17	0.000	0.000	f	f	0	f	0	0	-
## 263	48.17	1.335	0.335	f	f	0	f	0	120	-
## 264	20.42	10.500	0.000	f	f	0	t	154	32	-
## 265	50.75	0.585	0.000	f	f	0	f	145	0	-
## 266	17.08	0.085	0.040	f	f	0	f	140	722	-
## 267	18.33	1.210	0.000	f	f	0	f	100	0	-
## 268	32.00	6.000	1.250	f	f	0	f	272	0	-
## 269	59.67	1.540	0.125	t	f	0	t	260	0	+
## 270	18.00	0.165	0.210	f	f	0	f	200	40	+
## 271	37.58	0.000	0.000	f	f	0	f	NA	0	+
## 272	32.33	2.500	1.250	f	f	0	t	280	0	-
## 273	18.08	6.750	0.040	f	f	0	f	140	0	-
## 274	38.25	10.125	0.125	f	f	0	f	160	0	-
## 275	30.67	2.500	2.250	f	f	0	t	340	0	-
## 276	18.58	5.710	0.540	f	f	0	f	120	0	-
## 277	19.17	5.415	0.290	f	f	0	f	80	484	-
## 278	18.17	10.000	0.165	f	f	0	f	340	0	-
## 279	24.58	13.500	0.000	f	f	0	f	NA	0	-
## 280	16.25	0.835	0.085	t	f	0	f	200	0	-
## 281	21.17	0.875	0.250	f	f	0	f	280	204	-
## 282	23.92	0.585	0.125	f	f	0	f	240	1	-
## 283	17.67	4.460	0.250	f	f	0	f	80	0	-
## 284	16.50	1.250	0.250	f	t	1	f	108	98	-
## 285	23.25	12.625	0.125	f	t	2	f	0	5552	-
## 286	17.58	10.000	0.165	f	t	1	f	120	1	-
## 287	NA	1.500	0.000	f	t	2	t	200	105	-
## 288	29.50	0.580	0.290	f	t	1	f	340	2803	-
## 289	18.83	0.415	0.165	f	t	1	f	200	1	-
## 290	21.75	1.750	0.000	f	f	0	f	160	0	-
## 291	23.00	0.750	0.500	f	f	0	t	320	0	-
## 292	18.25	10.000	1.000	f	t	1	f	120	1	-
## 293	25.42	0.540	0.165	f	t	1	f	272	444	-
## 294	35.75	2.415	0.125	f	t	2	f	220	1	-
## 295	16.08	0.335	0.000	f	t	1	f	160	126	-
## 296	31.92	3.125	3.040	f	t	2	t	200	4	-
## 297	69.17	9.000	4.000	f	t	1	f	70	6	-
## 298	32.92	2.500	1.750	f	t	2	t	720	0	-
## 299	16.33	2.750	0.665	f	t	1	f	80	21	-
## 300	22.17	12.125	3.335	f	t	2	t	180	173	-
## 301	57.58	2.000	6.500	f	t	1	f	0	10	-
## 302	18.25	0.165	0.250	f	f	0	t	280	0	-
## 303	23.42	1.000	0.500	f	f	0	t	280	0	-
## 304	15.92	2.875	0.085	f	f	0	f	120	0	-
## 305	24.75	13.665	1.500	f	f	0	f	280	1	-
## 306	48.75	26.335	0.000	t	f	0	t	0	0	-
## 307	23.50	2.750	4.500	f	f	0	f	160	25	-
## 308	18.58	10.290	0.415	f	f	0	f	80	0	-
## 309	27.75	1.290	0.250	f	f	0	t	140	0	-
## 310	31.75	3.000	0.000	f	f	0	f	160	20	-
## 311	24.83	4.500	1.000	f	f	0	t	360	6	-

## 312	19.00	1.750	2.335	f	f	0	t	112	6	-
## 313	16.33	0.210	0.125	f	f	0	f	200	1	-
## 314	18.58	10.000	0.415	f	f	0	f	80	42	-
## 315	16.25	0.000	0.250	f	f	0	f	60	0	-
## 316	23.00	0.750	0.500	t	f	0	t	320	0	-
## 317	21.17	0.250	0.250	f	f	0	f	280	204	-
## 318	17.50	22.000	0.000	f	f	0	t	450	100000	+
## 319	19.17	0.000	0.000	f	f	0	t	500	1	+
## 320	36.75	0.125	1.500	f	f	0	t	232	113	+
## 321	21.25	1.500	1.500	f	f	0	f	150	8	+
## 322	18.08	0.375	10.000	f	f	0	t	300	0	+
## 323	33.67	0.375	0.375	f	f	0	f	300	44	+
## 324	48.58	0.205	0.250	t	t	11	f	380	2732	+
## 325	33.67	1.250	1.165	f	f	0	f	120	0	-
## 326	29.50	1.085	1.000	f	f	0	f	280	13	-
## 327	30.17	1.085	0.040	f	f	0	f	170	179	-
## 328	40.83	3.500	0.500	f	f	0	f	1160	0	-
## 329	34.83	2.500	3.000	f	f	0	f	200	0	-
## 330	NA	4.000	0.085	f	f	0	t	411	0	-
## 331	20.42	0.000	0.000	f	f	0	f	NA	0	-
## 332	33.25	2.500	2.500	f	f	0	t	0	2	-
## 333	34.08	2.500	1.000	f	f	0	f	460	16	-
## 334	25.25	12.500	1.000	f	f	0	t	180	1062	-
## 335	34.75	2.500	0.500	f	f	0	f	348	0	-
## 336	27.67	0.750	0.165	f	f	0	t	220	251	-
## 337	47.33	6.500	1.000	f	f	0	t	0	228	-
## 338	34.83	1.250	0.500	f	f	0	t	160	0	-
## 339	33.25	3.000	2.000	f	f	0	f	180	0	-
## 340	28.00	3.000	0.750	f	f	0	t	300	67	-
## 341	39.08	4.000	3.000	f	f	0	f	480	0	-
## 342	42.75	4.085	0.040	f	f	0	f	108	100	-
## 343	26.92	2.250	0.500	f	f	0	t	640	4000	-
## 344	33.75	2.750	0.000	f	f	0	f	180	0	-
## 345	38.92	1.750	0.500	f	f	0	t	300	2	-
## 346	62.75	7.000	0.000	f	f	0	f	0	12	-
## 347	32.25	1.500	0.250	f	f	0	t	372	122	-
## 348	26.75	4.500	2.500	f	f	0	f	200	1210	-
## 349	63.33	0.540	0.585	t	t	3	t	180	0	-
## 350	27.83	1.500	2.250	f	t	1	t	100	3	-
## 351	26.17	2.000	0.000	f	f	0	t	276	1	-
## 352	22.17	0.585	0.000	f	f	0	f	100	0	-
## 353	22.50	11.500	1.500	f	f	0	t	0	4000	-
## 354	30.75	1.585	0.585	f	f	0	t	0	0	-
## 355	36.67	2.000	0.250	f	f	0	t	221	0	-
## 356	16.00	0.165	1.000	f	t	2	t	320	1	-
## 357	41.17	1.335	0.165	f	f	0	f	168	0	-
## 358	19.50	0.165	0.040	f	f	0	t	380	0	-
## 359	32.42	3.000	0.165	f	f	0	t	120	0	-
## 360	36.75	4.710	0.000	f	f	0	f	160	0	-
## 361	30.25	5.500	5.500	f	f	0	t	100	0	-
## 362	23.08	2.500	0.085	f	f	0	t	100	4208	-
## 363	26.83	0.540	0.000	f	f	0	f	100	0	-

## 364	16.92	0.335	0.290	f	f	0	f	200	0	-
## 365	24.42	2.000	0.165	f	t	2	f	320	1300	-
## 366	42.83	1.250	13.875	f	t	1	t	352	112	-
## 367	22.75	6.165	0.165	f	f	0	f	220	1000	-
## 368	39.42	1.710	0.165	f	f	0	f	400	0	-
## 369	23.58	11.500	3.000	f	f	0	t	20	16	-
## 370	21.42	0.750	0.750	f	f	0	t	132	2	-
## 371	33.00	2.500	7.000	f	f	0	t	280	0	-
## 372	26.33	13.000	0.000	f	f	0	t	140	1110	-
## 373	45.00	4.585	1.000	f	f	0	t	240	0	-
## 374	26.25	1.540	0.125	f	f	0	f	100	0	-
## 375	28.17	0.585	0.040	f	f	0	f	260	1004	-
## 376	20.83	0.500	1.000	f	f	0	f	260	0	-
## 377	28.67	14.500	0.125	f	f	0	f	0	286	-
## 378	20.67	0.835	2.000	f	f	0	t	240	0	-
## 379	34.42	1.335	0.125	f	f	0	t	440	4500	-
## 380	33.58	0.250	4.000	f	f	0	t	420	0	-
## 381	43.17	5.000	2.250	f	f	0	t	141	0	-
## 382	22.67	7.000	0.165	f	f	0	f	160	0	-
## 383	24.33	2.500	4.500	f	f	0	f	200	456	-
## 384	56.83	4.250	5.000	f	f	0	t	0	4	-
## 385	22.08	11.460	1.585	f	f	0	t	100	1212	-
## 386	34.00	5.500	1.500	f	f	0	t	60	0	-
## 387	22.58	1.500	0.540	f	f	0	t	120	67	-
## 388	21.17	0.000	0.500	f	f	0	t	0	0	-
## 389	26.67	14.585	0.000	f	f	0	t	178	0	-
## 390	22.92	0.170	0.085	f	f	0	f	0	0	-
## 391	15.17	7.000	1.000	f	f	0	f	600	0	-
## 392	39.92	5.000	0.210	f	f	0	f	550	0	-
## 393	27.42	12.500	0.250	f	f	0	t	720	0	-
## 394	24.75	0.540	1.000	f	f	0	t	120	1	-
## 395	41.17	1.250	0.250	f	f	0	f	0	195	-
## 396	33.08	1.625	0.540	f	f	0	t	0	0	-
## 397	29.83	2.040	0.040	f	f	0	f	128	1	-
## 398	23.58	0.585	0.125	f	f	0	f	120	87	-
## 399	26.17	12.500	1.250	f	f	0	t	0	17	-
## 400	31.00	2.085	0.085	f	f	0	f	300	0	-
## 401	20.75	5.085	0.290	f	f	0	f	140	184	-
## 402	28.92	0.375	0.290	f	f	0	f	220	140	-
## 403	51.92	6.500	3.085	f	f	0	t	73	0	-
## 404	22.67	0.335	0.750	f	f	0	f	160	0	-
## 405	34.00	5.085	1.085	f	f	0	t	480	0	-
## 406	69.50	6.000	0.000	f	f	0	f	0	0	-
## 407	40.33	8.125	0.165	f	t	2	f	NA	18	-
## 408	19.58	0.665	1.000	f	t	1	f	2000	2	-
## 409	16.00	3.125	0.085	f	t	1	f	0	6	-
## 410	17.08	0.250	0.335	f	t	4	f	160	8	-
## 411	31.25	2.835	0.000	f	t	5	f	176	146	-
## 412	25.17	3.000	1.250	f	t	1	f	0	22	-
## 413	22.67	0.790	0.085	f	f	0	f	144	0	-
## 414	40.58	1.500	0.000	f	f	0	f	300	0	-
## 415	22.25	0.460	0.125	f	f	0	t	280	55	-

## 416	22.25	1.250	3.250	f	f	0	f	280	0	-
## 417	22.50	0.125	0.125	f	f	0	f	200	70	-
## 418	23.58	1.790	0.540	f	f	0	t	136	1	-
## 419	38.42	0.705	0.375	f	t	2	f	225	500	-
## 420	26.58	2.540	0.000	f	f	0	t	180	60	-
## 421	35.00	2.500	1.000	f	f	0	t	210	0	-
## 422	20.42	1.085	1.500	f	f	0	f	108	7	-
## 423	29.42	1.250	1.750	f	f	0	f	200	0	-
## 424	26.17	0.835	1.165	f	f	0	f	100	0	-
## 425	33.67	2.165	1.500	f	f	0	f	120	0	-
## 426	24.58	1.250	0.250	f	f	0	f	110	0	-
## 427	27.67	2.040	0.250	f	f	0	t	180	50	-
## 428	37.50	0.835	0.040	f	f	0	f	120	5	-
## 429	49.17	2.290	0.290	f	f	0	f	200	3	-
## 430	33.58	0.335	0.085	f	f	0	f	180	0	-
## 431	51.83	3.000	1.500	f	f	0	f	180	4	-
## 432	22.92	3.165	0.165	f	f	0	f	160	1058	-
## 433	21.83	1.540	0.085	f	f	0	t	356	0	-
## 434	25.25	1.000	0.500	f	f	0	f	200	0	-
## 435	58.58	2.710	2.415	f	f	0	t	320	0	-
## 436	19.00	0.000	0.000	f	t	4	f	45	1	-
## 437	19.58	0.585	0.000	f	t	3	f	350	769	-
## 438	53.33	0.165	0.000	f	f	0	t	62	27	-
## 439	27.17	1.250	0.000	f	t	1	f	92	300	-
## 440	25.92	0.875	0.375	f	t	2	t	174	3	-
## 441	23.08	0.000	1.000	f	t	11	f	0	0	-
## 442	39.58	5.000	0.000	f	t	2	f	17	1	-
## 443	30.58	2.710	0.125	f	f	0	t	80	0	-
## 444	17.25	3.000	0.040	f	f	0	t	160	40	-
## 445	17.67	0.000	0.000	f	f	0	f	86	0	-
## 446	NA	11.250	0.000	f	f	0	f	NA	5200	-
## 447	16.50	0.125	0.165	f	f	0	f	132	0	-
## 448	27.33	1.665	0.000	f	f	0	f	340	1	-
## 449	31.25	1.125	0.000	f	t	1	f	96	19	-
## 450	20.00	7.000	0.500	f	f	0	f	0	0	-
## 451	NA	3.000	7.000	f	f	0	f	0	1	-
## 452	39.50	1.625	1.500	f	f	0	f	0	316	-
## 453	36.50	4.250	3.500	f	f	0	f	454	50	-
## 454	29.75	0.665	0.250	f	f	0	t	300	0	-
## 455	52.42	1.500	3.750	f	f	0	t	0	350	-
## 456	36.17	18.125	0.085	f	f	0	f	320	3552	-
## 457	34.58	0.000	0.000	f	f	0	f	NA	0	-
## 458	29.67	0.750	0.040	f	f	0	f	240	0	-
## 459	36.17	5.500	5.000	f	f	0	f	210	687	-
## 460	25.67	0.290	1.500	f	f	0	t	160	0	-
## 461	24.50	2.415	0.000	f	f	0	f	120	0	-
## 462	24.08	0.875	0.085	f	t	4	f	254	1950	-
## 463	21.92	0.500	0.125	f	f	0	f	360	0	-
## 464	36.58	0.290	0.000	f	t	10	f	200	18	-
## 465	23.00	1.835	0.000	f	t	1	f	200	53	-
## 466	27.58	3.000	2.790	f	t	1	t	280	10	-
## 467	31.08	3.085	2.500	f	t	2	t	160	41	-

## 468	30.42	1.375	0.040	f	t	3	f	0	33	-
## 469	22.08	2.335	0.750	f	f	0	f	180	0	-
## 470	16.33	4.085	0.415	f	f	0	t	120	0	-
## 471	21.92	11.665	0.085	f	f	0	f	320	5	-
## 472	21.08	4.125	0.040	f	f	0	f	140	100	-
## 473	17.42	6.500	0.125	f	f	0	f	60	100	-
## 474	19.17	4.000	1.000	f	f	0	t	360	1000	-
## 475	20.67	0.415	0.125	f	f	0	f	0	44	-
## 476	26.75	2.000	0.750	f	f	0	t	80	0	-
## 477	23.58	0.835	0.085	f	f	0	t	220	5	-
## 478	39.17	2.500	10.000	f	f	0	t	200	0	-
## 479	22.75	11.500	0.415	f	f	0	f	0	0	-
## 480	26.50	2.710	0.085	f	f	0	f	80	0	-
## 481	16.92	0.500	0.165	f	t	6	t	240	35	-
## 482	23.50	3.165	0.415	f	t	1	t	280	80	-
## 483	17.33	9.500	1.750	f	t	10	t	0	10	-
## 484	23.75	0.415	0.040	f	t	2	f	128	6	-
## 485	34.67	1.080	1.165	f	f	0	f	28	0	-
## 486	74.83	19.000	0.040	f	t	2	f	0	351	-
## 487	28.17	0.125	0.085	f	f	0	f	216	2100	-
## 488	24.50	13.335	0.040	f	f	0	t	120	475	-
## 489	18.83	3.540	0.000	f	f	0	t	180	1	-
## 490	45.33	1.000	0.125	f	f	0	t	263	0	-
## 491	47.25	0.750	2.750	t	t	1	f	333	892	+
## 492	24.17	0.875	4.625	t	t	2	t	520	2000	+
## 493	39.25	9.500	6.500	t	t	14	f	240	4607	+
## 494	20.50	11.835	6.000	t	f	0	f	340	0	+
## 495	18.83	4.415	3.000	t	f	0	f	240	0	+
## 496	19.17	9.500	1.500	t	f	0	f	120	2206	+
## 497	25.00	0.875	1.040	t	f	0	t	160	5860	+
## 498	20.17	9.250	1.665	t	t	3	t	40	28	+
## 499	25.75	0.500	1.460	t	t	5	t	312	0	+
## 500	20.42	7.000	1.625	t	t	3	f	200	1391	+
## 501	NA	4.000	5.000	t	t	3	t	290	2279	+
## 502	39.00	5.000	3.500	t	t	10	t	0	0	+
## 503	64.08	0.165	0.000	t	t	1	f	232	100	+
## 504	28.25	5.125	4.750	t	t	2	f	420	7	+
## 505	28.75	3.750	1.085	t	t	1	t	371	0	+
## 506	31.33	19.500	7.000	t	t	16	f	0	5000	+
## 507	18.92	9.000	0.750	t	t	2	f	88	591	+
## 508	24.75	3.000	1.835	t	t	19	f	0	500	+
## 509	30.67	12.000	2.000	t	t	1	f	220	19	+
## 510	21.00	4.790	2.250	t	t	1	t	80	300	+
## 511	13.75	4.000	1.750	t	t	2	t	120	1000	+
## 512	46.00	4.000	0.000	t	f	0	f	100	960	+
## 513	44.33	0.000	2.500	t	f	0	f	0	0	+
## 514	20.25	9.960	0.000	t	f	0	f	0	0	+
## 515	22.67	2.540	2.585	t	f	0	f	0	0	+
## 516	NA	10.500	6.500	t	f	0	f	0	0	+
## 517	60.92	5.000	4.000	t	t	4	f	0	99	+
## 518	16.08	0.750	1.750	t	t	5	t	352	690	+
## 519	28.17	0.375	0.585	t	t	4	f	80	0	+

## 520	39.17	1.710	0.125	t	t	5	t	480	0	+
## 521	20.42	7.500	1.500	t	t	1	f	160	234	+
## 522	30.00	5.290	2.250	t	t	5	t	99	500	+
## 523	22.83	3.000	1.290	t	t	1	f	260	800	+
## 524	22.50	8.500	1.750	t	t	10	f	80	990	-
## 525	28.58	1.665	2.415	t	f	0	t	440	0	-
## 526	45.17	1.500	2.500	t	f	0	t	140	0	-
## 527	41.58	1.750	0.210	t	f	0	f	160	0	-
## 528	57.08	0.335	1.000	t	f	0	t	252	2197	-
## 529	55.75	7.080	6.750	t	t	3	t	100	50	-
## 530	43.25	25.210	0.210	t	t	1	f	760	90	-
## 531	25.33	2.085	2.750	t	f	0	t	360	1	-
## 532	24.58	0.670	1.750	t	f	0	f	400	0	-
## 533	43.17	2.250	0.750	t	f	0	f	560	0	-
## 534	40.92	0.835	0.000	t	f	0	f	130	1	-
## 535	31.83	2.500	7.500	t	f	0	t	523	0	-
## 536	33.92	1.585	0.000	t	f	0	f	320	0	-
## 537	24.92	1.250	0.000	t	f	0	f	80	0	-
## 538	35.25	3.165	3.750	t	f	0	t	680	0	-
## 539	34.25	1.750	0.250	t	f	0	t	163	0	-
## 540	80.25	5.500	0.540	t	f	0	f	0	340	-
## 541	19.42	1.500	2.000	t	f	0	t	100	20	-
## 542	42.75	3.000	1.000	t	f	0	f	0	200	-
## 543	19.67	10.000	0.835	t	f	0	t	140	0	-
## 544	36.33	3.790	1.165	t	f	0	t	200	0	-
## 545	30.08	1.040	0.500	t	t	10	t	132	28	-
## 546	44.25	11.000	1.500	t	f	0	f	0	0	-
## 547	23.58	0.460	2.625	t	t	6	t	208	347	-
## 548	23.92	1.500	1.875	t	t	6	f	200	327	+
## 549	33.17	1.000	0.750	t	t	7	t	340	4071	+
## 550	48.33	12.000	16.000	t	f	0	f	110	0	+
## 551	76.75	22.290	12.750	t	t	1	t	0	109	+
## 552	51.33	10.000	0.000	t	t	11	f	0	1249	+
## 553	34.75	15.000	5.375	t	t	9	t	0	134	+
## 554	38.58	3.335	4.000	t	t	14	f	383	1344	+
## 555	22.42	11.250	0.750	t	t	4	f	0	321	+
## 556	41.92	0.420	0.210	t	t	6	f	220	948	+
## 557	29.58	4.500	7.500	t	t	2	t	330	0	+
## 558	32.17	1.460	1.085	t	t	16	f	120	2079	+
## 559	51.42	0.040	0.040	t	f	0	f	0	3000	+
## 560	22.83	2.290	2.290	t	t	7	t	140	2384	+
## 561	25.00	12.330	3.500	t	t	6	f	400	458	+
## 562	26.75	1.125	1.250	t	f	0	f	0	5298	+
## 563	23.33	1.500	1.415	t	f	0	f	422	200	+
## 564	24.42	12.335	1.585	t	f	0	t	120	0	+
## 565	42.17	5.040	12.750	t	f	0	t	92	0	+
## 566	20.83	3.000	0.040	t	f	0	f	100	0	+
## 567	23.08	11.500	2.125	t	t	11	t	290	284	+
## 568	25.17	2.875	0.875	t	f	0	f	360	0	+
## 569	43.08	0.375	0.375	t	t	8	t	300	162	+
## 570	35.75	0.915	0.750	t	t	4	f	0	1583	+
## 571	59.50	2.750	1.750	t	t	5	t	60	58	+

## 572	21.00	3.000	1.085	t	t	8	t	160	1	+
## 573	21.92	0.540	0.040	t	t	1	t	840	59	+
## 574	65.17	14.000	0.000	t	t	11	t	0	1400	+
## 575	20.33	10.000	1.000	t	t	4	f	50	1465	+
## 576	32.25	0.165	3.250	t	t	1	t	432	8000	+
## 577	30.17	0.500	1.750	t	t	11	f	32	540	+
## 578	25.17	6.000	1.000	t	t	3	f	0	0	+
## 579	39.17	1.625	1.500	t	t	10	f	186	4700	+
## 580	39.08	6.000	1.290	t	t	5	t	108	1097	+
## 581	31.67	0.830	1.335	t	t	8	t	303	3290	+
## 582	41.00	0.040	0.040	f	t	1	f	560	0	+
## 583	48.50	4.250	0.125	t	f	0	t	225	0	+
## 584	32.67	9.000	5.250	t	f	0	t	154	0	+
## 585	28.08	15.000	0.000	t	f	0	f	0	13212	+
## 586	73.42	17.750	0.000	t	f	0	t	0	0	+
## 587	64.08	20.000	17.500	t	t	9	t	0	1000	+
## 588	51.58	15.000	8.500	t	t	9	f	0	0	+
## 589	26.67	1.750	1.000	t	t	5	t	160	5777	+
## 590	25.33	0.580	0.290	t	t	7	t	96	5124	+
## 591	30.17	6.500	3.125	t	t	8	f	330	1200	+
## 592	27.00	0.750	4.250	t	t	3	t	312	150	+
## 593	23.17	0.000	0.000	f	f	0	f	NA	0	+
## 594	34.17	5.250	0.085	f	f	0	t	290	6	+
## 595	38.67	0.210	0.085	t	f	0	t	280	0	+
## 596	25.75	0.750	0.250	t	f	0	f	349	23	+
## 597	46.08	3.000	2.375	t	t	8	t	396	4159	+
## 598	21.50	6.000	2.500	t	t	3	f	80	918	+
## 599	20.08	0.125	1.000	f	t	1	f	240	768	+
## 600	20.50	2.415	2.000	t	t	11	t	200	3000	+
## 601	29.50	0.460	0.540	t	t	4	f	380	500	+
## 602	42.25	1.750	0.000	f	f	0	t	150	1	-
## 603	29.83	1.250	0.250	f	f	0	f	224	0	-
## 604	20.08	0.250	0.125	f	f	0	f	200	0	-
## 605	23.42	0.585	0.085	t	f	0	f	180	0	-
## 606	29.58	1.750	1.250	f	f	0	t	280	0	-
## 607	16.17	0.040	0.040	f	f	0	f	0	0	+
## 608	32.33	3.500	0.500	f	f	0	t	232	0	-
## 609	NA	0.040	4.250	f	f	0	t	460	0	-
## 610	47.83	4.165	0.085	f	f	0	t	520	0	-
## 611	20.00	1.250	0.125	f	f	0	f	140	4	-
## 612	27.58	3.250	5.085	f	t	2	t	369	1	-
## 613	22.00	0.790	0.290	f	t	1	f	420	283	-
## 614	19.33	10.915	0.585	f	t	2	t	200	7	-
## 615	38.33	4.415	0.125	f	f	0	f	160	0	-
## 616	29.42	1.250	0.250	f	t	2	t	400	108	-
## 617	22.67	0.750	1.585	f	t	1	t	400	9	-
## 618	32.25	14.000	0.000	f	t	2	f	160	1	-
## 619	29.58	4.750	2.000	f	t	1	t	460	68	-
## 620	18.42	10.415	0.125	t	f	0	f	120	375	-
## 621	22.17	2.250	0.125	f	f	0	f	160	10	-
## 622	22.67	0.165	2.250	f	f	0	t	0	0	+
## 623	25.58	0.000	0.000	f	f	0	f	NA	0	+

## 624	18.83	0.000	0.665	f	f	0	f	160	1	-
## 625	21.58	0.790	0.665	f	f	0	f	160	0	-
## 626	23.75	12.000	2.085	f	f	0	f	80	0	-
## 627	22.00	7.835	0.165	f	f	0	t	NA	0	-
## 628	36.08	2.540	0.000	f	f	0	f	0	1000	-
## 629	29.25	13.000	0.500	f	f	0	f	228	0	-
## 630	19.58	0.665	1.665	f	f	0	f	220	5	-
## 631	22.92	1.250	0.250	f	f	0	t	120	809	-
## 632	27.25	0.290	0.125	f	t	1	t	272	108	-
## 633	38.75	1.500	0.000	f	f	0	f	76	0	-
## 634	32.42	2.165	0.000	f	f	0	f	120	0	-
## 635	23.75	0.710	0.250	f	t	1	t	240	4	-
## 636	18.17	2.460	0.960	f	t	2	t	160	587	-
## 637	40.92	0.500	0.500	f	f	0	t	130	0	-
## 638	19.50	9.585	0.790	f	f	0	f	80	350	-
## 639	28.58	3.625	0.250	f	f	0	t	100	0	-
## 640	35.58	0.750	1.500	f	f	0	t	231	0	-
## 641	34.17	2.750	2.500	f	f	0	t	232	200	-
## 642	33.17	2.250	3.500	f	f	0	t	200	141	-
## 643	31.58	0.750	3.500	f	f	0	t	320	0	-
## 644	52.50	7.000	3.000	f	f	0	f	0	0	-
## 645	36.17	0.420	0.290	f	f	0	t	309	2	-
## 646	37.33	2.665	0.165	f	f	0	t	0	501	-
## 647	20.83	8.500	0.165	f	f	0	f	0	351	-
## 648	24.08	9.000	0.250	f	f	0	t	0	0	-
## 649	25.58	0.335	3.500	f	f	0	t	340	0	-
## 650	35.17	3.750	0.000	f	t	6	f	0	200	-
## 651	48.08	3.750	1.000	f	f	0	f	100	2	-
## 652	15.83	7.625	0.125	f	t	1	t	0	160	-
## 653	22.50	0.415	0.335	f	f	0	t	144	0	-
## 654	21.50	11.500	0.500	t	f	0	t	100	68	-
## 655	23.58	0.830	0.415	f	t	1	t	200	11	-
## 656	21.08	5.000	0.000	f	f	0	f	0	0	-
## 657	25.67	3.250	2.290	f	t	1	t	416	21	-
## 658	38.92	1.665	0.250	f	f	0	f	0	390	-
## 659	15.75	0.375	1.000	f	f	0	f	120	18	-
## 660	28.58	3.750	0.250	f	t	1	t	40	154	-
## 661	22.25	9.000	0.085	f	f	0	f	0	0	-
## 662	29.83	3.500	0.165	f	f	0	f	216	0	-
## 663	23.50	1.500	0.875	f	f	0	t	160	0	-
## 664	32.08	4.000	1.500	f	f	0	t	120	0	-
## 665	31.08	1.500	0.040	f	f	0	f	160	0	-
## 666	31.83	0.040	0.040	f	f	0	f	0	0	-
## 667	21.75	11.750	0.250	f	f	0	t	180	0	-
## 668	17.92	0.540	1.750	f	t	1	t	80	5	-
## 669	30.33	0.500	0.085	f	f	0	t	252	0	-
## 670	51.83	2.040	1.500	f	f	0	f	120	1	-
## 671	47.17	5.835	5.500	f	f	0	f	465	150	-
## 672	25.83	12.835	0.500	f	f	0	f	0	2	-
## 673	50.25	0.835	0.500	f	f	0	t	240	117	-
## 674	29.50	2.000	2.000	f	f	0	f	256	17	-
## 675	37.33	2.500	0.210	f	f	0	f	260	246	-

## 676	41.58	1.040	0.665	f	f	0	f	240	237	-
## 677	30.58	10.665	0.085	f	t	12	t	129	3	-
## 678	19.42	7.250	0.040	f	t	1	f	100	1	-
## 679	17.92	10.210	0.000	f	f	0	f	0	50	-
## 680	20.08	1.250	0.000	f	f	0	f	0	0	-
## 681	19.50	0.290	0.290	f	f	0	f	280	364	-
## 682	27.83	1.000	3.000	f	f	0	f	176	537	-
## 683	17.08	3.290	0.335	f	f	0	t	140	2	-
## 684	36.42	0.750	0.585	f	f	0	f	240	3	-
## 685	40.58	3.290	3.500	f	f	0	t	400	0	-
## 686	21.08	10.085	1.250	f	f	0	f	260	0	-
## 687	22.67	0.750	2.000	f	t	2	t	200	394	-
## 688	25.25	13.500	2.000	f	t	1	t	200	1	-
## 689	17.92	0.205	0.040	f	f	0	f	280	750	-
## 690	35.00	3.375	8.290	f	f	0	t	0	0	-
## credit.score ages										
## 1	664.60	58								
## 2	693.88	54								
## 3	621.82	62								
## 4	653.97	51								
## 5	670.26	58								
## 6	672.16	37								
## 7	693.53	47								
## 8	697.57	67								
## 9	704.22	61								
## 10	722.97	62								
## 11	677.64	41								
## 12	675.62	51								
## 13	657.88	51								
## 14	717.00	32								
## 15	741.70	51								
## 16	600.64	59								
## 17	712.13	49								
## 18	682.23	49								
## 19	652.96	46								
## 20	733.69	55								
## 21	664.53	58								
## 22	710.16	43								
## 23	695.52	43								
## 24	662.91	47								
## 25	736.13	43								
## 26	590.82	63								
## 27	677.87	51								
## 28	623.93	45								
## 29	675.94	40								
## 30	787.31	49								
## 31	705.56	38								
## 32	771.17	52								
## 33	653.67	54								
## 34	663.27	42								
## 35	753.83	45								
## 36	664.91	62								

## 37	680.70	50
## 38	730.97	57
## 39	660.98	43
## 40	653.45	59
## 41	628.75	39
## 42	697.67	36
## 43	717.06	61
## 44	697.27	48
## 45	697.62	58
## 46	653.99	61
## 47	635.95	57
## 48	737.76	50
## 49	712.99	48
## 50	684.82	55
## 51	719.12	35
## 52	727.22	45
## 53	714.25	49
## 54	743.68	41
## 55	738.52	51
## 56	633.10	43
## 57	736.88	44
## 58	681.92	35
## 59	647.96	54
## 60	766.69	57
## 61	705.03	52
## 62	765.37	54
## 63	635.55	35
## 64	739.70	35
## 65	637.83	60
## 66	690.23	45
## 67	687.44	54
## 68	709.75	42
## 69	632.59	32
## 70	744.27	46
## 71	657.94	52
## 72	674.26	52
## 73	689.36	58
## 74	723.65	56
## 75	714.43	53
## 76	693.65	52
## 77	655.94	55
## 78	786.51	44
## 79	782.81	51
## 80	657.55	50
## 81	705.86	52
## 82	713.99	52
## 83	754.96	54
## 84	752.21	50
## 85	780.52	54
## 86	742.09	54
## 87	677.58	44
## 88	666.99	36

## 89	752.67	51
## 90	659.90	48
## 91	672.47	40
## 92	738.33	39
## 93	699.88	71
## 94	687.46	55
## 95	753.72	36
## 96	756.46	50
## 97	738.47	84
## 98	723.07	49
## 99	609.08	61
## 100	731.63	71
## 101	665.84	44
## 102	673.01	31
## 103	678.56	40
## 104	650.48	56
## 105	692.04	80
## 106	724.12	49
## 107	659.13	58
## 108	744.20	55
## 109	738.78	45
## 110	624.49	58
## 111	733.08	53
## 112	741.71	56
## 113	725.87	52
## 114	752.45	64
## 115	720.82	34
## 116	754.25	55
## 117	666.90	48
## 118	689.09	69
## 119	678.87	56
## 120	736.15	51
## 121	609.25	29
## 122	666.26	61
## 123	705.50	51
## 124	661.53	43
## 125	683.63	51
## 126	761.67	59
## 127	740.73	52
## 128	748.52	41
## 129	645.12	36
## 130	624.72	45
## 131	756.49	25
## 132	698.45	52
## 133	717.23	47
## 134	696.89	44
## 135	695.76	42
## 136	759.31	43
## 137	681.12	44
## 138	632.24	58
## 139	677.64	35
## 140	706.39	30

## 141	728.74	55
## 142	695.54	34
## 143	682.69	63
## 144	715.91	44
## 145	736.56	41
## 146	636.93	51
## 147	705.10	57
## 148	661.20	50
## 149	675.80	33
## 150	658.80	29
## 151	676.96	53
## 152	732.79	74
## 153	670.67	47
## 154	654.72	51
## 155	691.07	74
## 156	735.64	42
## 157	682.50	45
## 158	660.49	41
## 159	709.89	52
## 160	686.50	57
## 161	708.23	36
## 162	620.56	58
## 163	710.83	43
## 164	741.86	58
## 165	676.04	50
## 166	782.78	50
## 167	710.69	46
## 168	674.92	46
## 169	705.31	50
## 170	745.20	49
## 171	680.30	58
## 172	689.42	40
## 173	708.54	39
## 174	795.11	43
## 175	705.02	43
## 176	723.90	49
## 177	722.09	41
## 178	730.63	46
## 179	721.27	55
## 180	740.63	56
## 181	716.05	59
## 182	661.43	62
## 183	673.00	57
## 184	764.06	37
## 185	663.21	52
## 186	757.55	48
## 187	675.67	37
## 188	646.45	66
## 189	654.09	37
## 190	685.16	48
## 191	678.92	47
## 192	724.70	47

## 193	708.78	64
## 194	693.73	45
## 195	741.40	47
## 196	671.45	46
## 197	677.74	55
## 198	772.16	44
## 199	632.39	54
## 200	800.20	53
## 201	717.80	43
## 202	659.42	46
## 203	729.35	41
## 204	805.80	55
## 205	708.24	43
## 206	661.58	39
## 207	647.30	55
## 208	668.30	62
## 209	619.35	30
## 210	669.80	27
## 211	666.28	47
## 212	613.53	29
## 213	664.64	43
## 214	717.74	55
## 215	744.19	47
## 216	659.63	49
## 217	742.60	50
## 218	744.73	38
## 219	669.11	47
## 220	665.84	57
## 221	678.73	46
## 222	754.94	61
## 223	675.26	41
## 224	701.05	54
## 225	682.52	50
## 226	694.52	43
## 227	694.52	50
## 228	720.46	41
## 229	715.79	50
## 230	732.68	58
## 231	684.33	34
## 232	687.48	29
## 233	679.58	37
## 234	719.72	25
## 235	706.22	31
## 236	681.79	33
## 237	666.40	22
## 238	714.98	26
## 239	608.79	33
## 240	714.65	36
## 241	681.09	40
## 242	698.73	32
## 243	751.47	34
## 244	685.64	27

## 245	732.72	27
## 246	730.42	33
## 247	701.81	29
## 248	670.88	35
## 249	712.38	24
## 250	697.48	20
## 251	757.73	26
## 252	718.59	31
## 253	689.85	29
## 254	633.78	25
## 255	703.11	22
## 256	668.75	33
## 257	703.67	25
## 258	705.15	28
## 259	756.44	33
## 260	749.76	34
## 261	756.91	27
## 262	777.81	31
## 263	638.42	35
## 264	737.34	24
## 265	602.25	38
## 266	724.94	26
## 267	697.30	38
## 268	726.42	30
## 269	689.55	24
## 270	725.24	24
## 271	721.43	30
## 272	700.60	38
## 273	681.72	32
## 274	709.70	29
## 275	629.06	27
## 276	623.01	30
## 277	636.16	26
## 278	725.84	30
## 279	778.61	25
## 280	708.89	19
## 281	703.04	32
## 282	723.29	34
## 283	709.51	38
## 284	677.82	29
## 285	701.96	28
## 286	639.93	21
## 287	706.52	21
## 288	640.93	27
## 289	710.92	24
## 290	662.12	32
## 291	704.88	25
## 292	671.72	33
## 293	683.70	33
## 294	635.99	27
## 295	737.29	19
## 296	775.90	32

## 297	684.19	36
## 298	715.39	30
## 299	752.31	25
## 300	643.53	27
## 301	707.03	36
## 302	675.67	29
## 303	750.69	30
## 304	647.66	32
## 305	701.99	29
## 306	701.41	31
## 307	756.91	31
## 308	764.74	34
## 309	680.22	45
## 310	785.93	30
## 311	643.94	30
## 312	638.40	35
## 313	688.48	21
## 314	716.49	32
## 315	684.57	20
## 316	726.66	24
## 317	732.19	21
## 318	640.13	28
## 319	682.62	39
## 320	690.65	27
## 321	761.11	29
## 322	748.60	34
## 323	690.02	34
## 324	706.16	34
## 325	645.63	28
## 326	683.36	36
## 327	731.82	31
## 328	752.94	30
## 329	652.34	34
## 330	653.67	24
## 331	630.27	28
## 332	613.17	28
## 333	710.83	23
## 334	647.33	27
## 335	654.21	21
## 336	656.39	27
## 337	714.54	35
## 338	767.85	29
## 339	701.62	29
## 340	721.38	31
## 341	725.67	32
## 342	667.49	18
## 343	749.12	32
## 344	707.74	30
## 345	670.47	23
## 346	732.51	30
## 347	662.62	39
## 348	644.13	32

## 349	654.02	27
## 350	676.13	27
## 351	648.50	33
## 352	666.18	42
## 353	740.06	25
## 354	655.76	32
## 355	718.97	27
## 356	732.03	26
## 357	694.92	26
## 358	675.90	35
## 359	620.84	29
## 360	767.48	24
## 361	692.02	25
## 362	687.86	27
## 363	723.53	28
## 364	629.57	31
## 365	752.37	25
## 366	667.97	31
## 367	658.14	30
## 368	694.54	27
## 369	759.43	24
## 370	706.41	32
## 371	710.53	23
## 372	585.14	31
## 373	683.31	39
## 374	694.34	32
## 375	701.12	28
## 376	718.98	29
## 377	674.55	28
## 378	749.52	29
## 379	699.87	35
## 380	684.44	34
## 381	733.55	17
## 382	761.79	32
## 383	618.94	27
## 384	690.88	25
## 385	670.79	30
## 386	714.83	26
## 387	711.58	27
## 388	631.71	33
## 389	710.04	21
## 390	718.00	36
## 391	708.19	28
## 392	730.30	36
## 393	706.53	30
## 394	673.50	28
## 395	730.09	31
## 396	652.94	26
## 397	700.50	33
## 398	647.59	33
## 399	697.35	25
## 400	707.79	34

## 401	735.25	34
## 402	682.19	34
## 403	643.69	33
## 404	692.53	23
## 405	788.35	27
## 406	742.79	30
## 407	682.31	31
## 408	732.32	45
## 409	685.33	33
## 410	749.92	23
## 411	710.23	34
## 412	707.24	31
## 413	758.95	29
## 414	759.04	30
## 415	685.01	28
## 416	661.75	29
## 417	700.05	26
## 418	625.21	33
## 419	680.94	35
## 420	688.05	36
## 421	726.57	28
## 422	589.38	39
## 423	646.99	31
## 424	644.55	24
## 425	689.79	26
## 426	623.27	30
## 427	699.28	34
## 428	666.80	39
## 429	721.09	26
## 430	659.59	30
## 431	643.38	34
## 432	715.74	34
## 433	732.38	31
## 434	686.87	31
## 435	721.87	33
## 436	707.45	33
## 437	762.83	36
## 438	706.23	26
## 439	677.95	24
## 440	700.14	33
## 441	741.25	32
## 442	738.35	31
## 443	649.06	32
## 444	646.84	26
## 445	747.29	29
## 446	748.25	29
## 447	731.50	33
## 448	727.37	26
## 449	695.58	27
## 450	697.34	32
## 451	754.04	39
## 452	721.21	29

## 453	678.22	27
## 454	739.34	32
## 455	660.62	29
## 456	693.81	27
## 457	680.82	34
## 458	754.07	27
## 459	680.91	36
## 460	672.65	28
## 461	628.15	27
## 462	693.81	48
## 463	684.18	44
## 464	732.12	54
## 465	719.20	30
## 466	738.20	44
## 467	666.36	38
## 468	660.74	41
## 469	631.25	38
## 470	688.58	43
## 471	640.83	42
## 472	653.12	46
## 473	714.42	34
## 474	702.47	51
## 475	746.66	37
## 476	663.50	48
## 477	715.85	43
## 478	634.16	40
## 479	720.97	44
## 480	773.79	40
## 481	669.02	36
## 482	674.05	37
## 483	663.82	34
## 484	709.00	40
## 485	675.72	33
## 486	778.14	41
## 487	713.02	49
## 488	737.05	35
## 489	711.90	38
## 490	747.00	32
## 491	608.68	35
## 492	731.01	38
## 493	683.37	41
## 494	796.09	42
## 495	733.32	43
## 496	691.96	27
## 497	729.50	47
## 498	754.33	37
## 499	630.35	46
## 500	678.05	44
## 501	701.82	30
## 502	691.04	36
## 503	726.14	53
## 504	707.81	43

## 505	708.95	32
## 506	700.18	34
## 507	703.94	45
## 508	686.17	32
## 509	665.63	29
## 510	716.44	40
## 511	633.46	35
## 512	651.88	42
## 513	719.46	31
## 514	691.24	34
## 515	692.70	40
## 516	673.82	24
## 517	758.99	49
## 518	694.06	53
## 519	771.29	36
## 520	600.21	32
## 521	664.23	37
## 522	680.73	47
## 523	650.67	39
## 524	742.43	54
## 525	673.73	32
## 526	693.72	34
## 527	673.69	36
## 528	706.96	36
## 529	723.76	53
## 530	694.58	50
## 531	653.77	36
## 532	677.41	57
## 533	683.43	52
## 534	749.74	32
## 535	632.90	53
## 536	701.81	47
## 537	689.90	22
## 538	619.55	49
## 539	728.90	45
## 540	673.59	36
## 541	698.64	40
## 542	620.93	31
## 543	641.27	51
## 544	717.31	40
## 545	749.40	45
## 546	703.28	39
## 547	706.05	43
## 548	705.23	33
## 549	659.98	33
## 550	757.56	49
## 551	618.21	43
## 552	713.79	56
## 553	652.62	47
## 554	670.44	42
## 555	737.92	39
## 556	676.07	43

## 557	743.75	45
## 558	695.69	40
## 559	703.03	59
## 560	711.69	29
## 561	738.63	30
## 562	655.44	41
## 563	708.79	42
## 564	721.91	44
## 565	727.57	47
## 566	642.33	22
## 567	649.75	24
## 568	698.62	47
## 569	695.54	62
## 570	717.05	49
## 571	731.06	42
## 572	779.41	39
## 573	671.54	34
## 574	806.00	44
## 575	627.07	47
## 576	777.26	34
## 577	666.73	45
## 578	696.26	44
## 579	633.85	45
## 580	736.95	43
## 581	700.81	44
## 582	766.74	37
## 583	629.41	29
## 584	720.34	42
## 585	706.43	44
## 586	760.91	26
## 587	700.05	44
## 588	726.16	53
## 589	671.21	46
## 590	753.07	34
## 591	681.81	45
## 592	661.55	25
## 593	681.89	46
## 594	721.15	38
## 595	703.70	37
## 596	656.95	45
## 597	684.49	46
## 598	688.40	51
## 599	719.97	36
## 600	646.00	40
## 601	698.71	42
## 602	744.89	42
## 603	635.32	37
## 604	660.73	38
## 605	703.71	34
## 606	658.95	32
## 607	670.27	36
## 608	685.63	39

## 609	787.79	44
## 610	788.98	44
## 611	704.57	32
## 612	671.63	37
## 613	698.61	45
## 614	661.24	42
## 615	736.05	57
## 616	629.05	33
## 617	696.53	42
## 618	607.17	32
## 619	649.92	52
## 620	667.30	34
## 621	703.48	47
## 622	662.74	42
## 623	703.16	45
## 624	704.50	39
## 625	720.67	43
## 626	669.83	49
## 627	583.66	34
## 628	662.45	39
## 629	736.86	40
## 630	648.24	45
## 631	674.65	42
## 632	746.58	39
## 633	712.51	37
## 634	690.65	26
## 635	682.26	26
## 636	721.09	40
## 637	649.36	49
## 638	662.45	30
## 639	625.58	34
## 640	681.78	43
## 641	633.40	40
## 642	591.78	33
## 643	691.87	41
## 644	758.32	44
## 645	730.89	28
## 646	662.92	37
## 647	672.00	38
## 648	655.46	30
## 649	754.29	37
## 650	763.84	33
## 651	601.94	48
## 652	701.98	43
## 653	728.29	36
## 654	785.06	31
## 655	730.85	33
## 656	651.92	28
## 657	676.35	49
## 658	721.55	45
## 659	667.67	41
## 660	677.12	35

```
## 661      637.08  49
## 662      750.92  39
## 663      667.10  36
## 664      713.45  36
## 665      644.80  38
## 666      740.15  38
## 667      743.55  29
## 668      675.32  40
## 669      680.54  33
## 670      635.72  43
## 671      753.56  31
## 672      592.29  47
## 673      706.14  27
## 674      660.98  46
## 675      729.96  34
## 676      722.24  40
## 677      740.84  43
## 678      702.05  36
## 679      628.38  35
## 680      745.54  35
## 681      689.77  39
## 682      758.88  48
## 683      752.54  38
## 684      682.87  41
## 685      656.14  25
## 686      736.22  36
## 687      643.56  32
## 688      665.36  38
## 689      716.15  35
## 690      739.94  45
```

```
# Convert the "approval" variable to a factor
data$approval <- as.factor(data$approval)

set.seed(123) # Set the seed for reproducibility
train_index <- createDataPartition(data$approval, p = 0.7, list = FALSE)
train_data <- data[train_index, ]
test_data <- data[-train_index, ]
# Impute missing values with mean imputation
train_data <- na.omit(train_data) # Remove rows with missing values

# Remove rows with missing values
train_data <- na.omit(train_data)

# Train a random forest model
model <- randomForest(approval ~ ., data = train_data, ntree = 500, importance = TRUE)

# Get feature importance
feature_importance <- importance(model)
print(feature_importance)
```

	-	+ MeanDecreaseAccuracy	MeanDecreaseGini
## X	32.5594105	18.1598238	31.5822823
## cont1	-1.9221564	-0.8056629	-1.9571665
## cont2	3.0295009	7.1381483	7.4628001
## cont3	3.8428785	8.0752999	8.7570083
## bool1	36.5902243	31.8849281	40.6971063
## bool2	6.4989562	12.1520948	12.6403446
## cont4	9.6790554	12.9348556	15.4193160
## bool3	3.5390713	-3.8904486	-0.3472090
## cont5	6.1761311	5.2248519	8.0915051
## cont6	11.9501009	8.9761865	14.9999979
## credit.score	0.2922723	-0.9019413	-0.4214291
## ages	15.8175726	0.4113273	14.1555333
			15.370578

```
# problem 4(A)
# Load the required libraries
library(rpart)

# Create your decision tree model
tree_model <- rpart(approval ~ ., data = train_data, method = "class", control = rpart.control(minsplit = 10, maxdepth = 20))

tree_model
```

```
## n= 466
##
## node), split, n, loss, yval, (yprob)
##      * denotes terminal node
##
##  1) root 466 208 - (0.55364807 0.44635193)
##    2) bool1=f 227 15 - (0.93392070 0.06607930)
##      4) X>=214 221 10 - (0.95475113 0.04524887) *
##      5) X< 214 6 1 + (0.16666667 0.83333333) *
##    3) bool1=t 239 46 + (0.19246862 0.80753138)
##      6) cont6< 422 147 45 + (0.30612245 0.69387755)
##        12) X>=69 119 45 + (0.37815126 0.62184874)
##          24) X< 118 27 0 - (1.00000000 0.00000000) *
##          25) X>=118 92 18 + (0.19565217 0.80434783)
##            50) X>=523.5 31 14 - (0.54838710 0.45161290)
##            100) X< 547.5 15 0 - (1.00000000 0.00000000) *
##            101) X>=547.5 16 2 + (0.12500000 0.87500000) *
##            51) X< 523.5 61 1 + (0.01639344 0.98360656) *
##        13) X< 69 28 0 + (0.00000000 1.00000000) *
##    7) cont6>=422 92 1 + (0.01086957 0.98913043) *
```

```
#problem 4(B)

# Load the required library
library(caret)

# Run variable importance analysis on the model
variable_importance <- varImp(tree_model)

# Print the variable importance results
print(variable_importance)
```

```
## Overall
## ages      43.523283
## bool1     128.007088
## bool2      78.168246
## cont2     10.355406
## cont3      6.046748
## cont4     82.970571
## cont5     20.705675
## cont6     10.299934
## credit.score  2.168172
## X        155.836746
## cont1      0.000000
## bool3      0.000000
```

#problem 4(C)

```
# Load the required libraries
library(caret)
library(ggplot2)

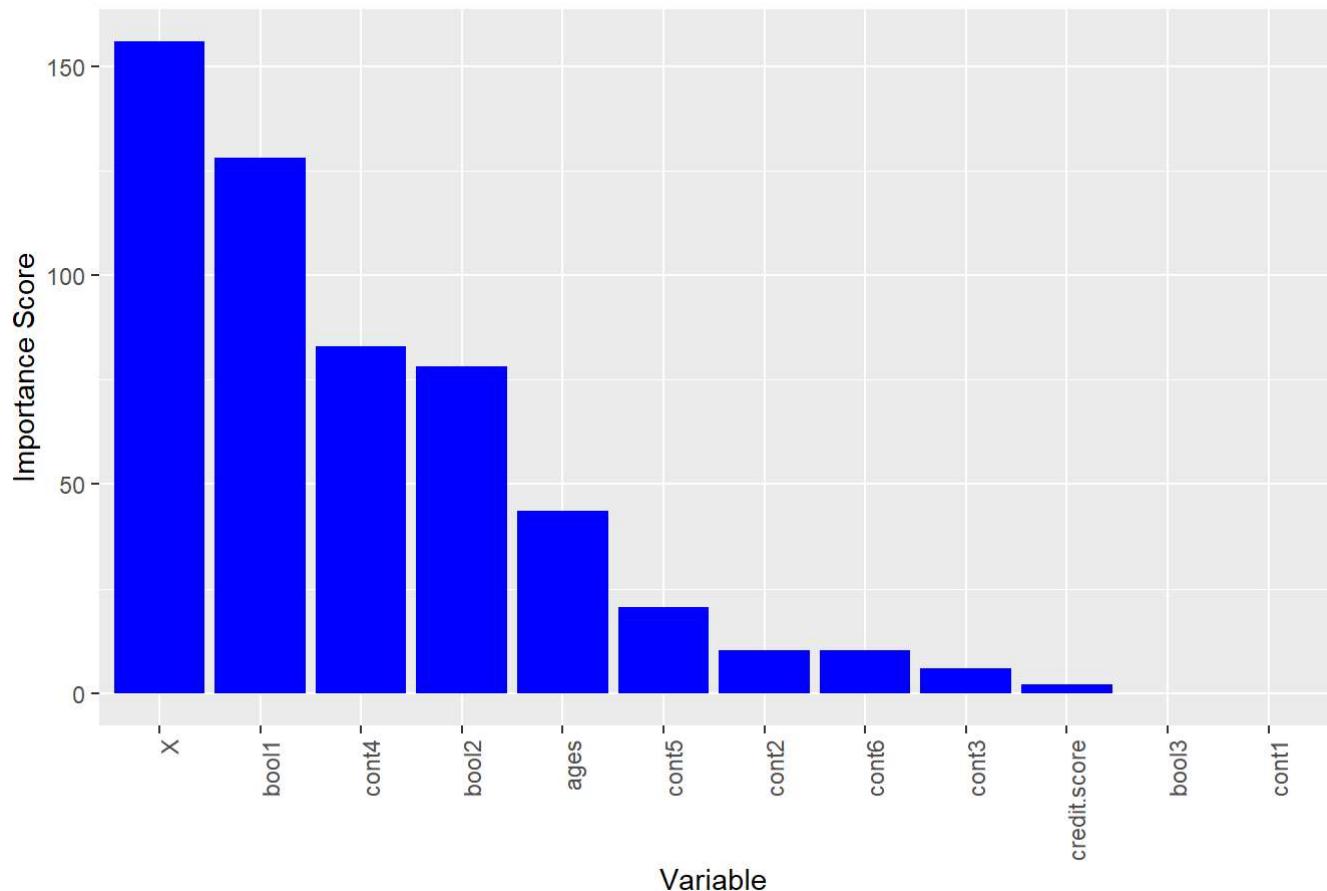
tree_model <- rpart(approval ~ ., data = train_data, method = "class", control = rpart.control(m
insplit = 10, maxdepth = 20))
# Run variable importance analysis on the model
variable_importance <- varImp(tree_model)

# Create a data frame for plotting
importance_df <- data.frame(Variable = rownames(variable_importance), Importance = variable_impo
rtance$Overall)

# Sort the data frame by importance score (descending order)
importance_df <- importance_df[order(-importance_df$Importance), ]

# Create a bar plot
ggplot(importance_df, aes(x = reorder(Variable, -Importance), y = Importance)) +
  geom_bar(stat = "identity", fill = "blue") +
  xlab("Variable") +
  ylab("Importance Score") +
  ggtitle("Variable Importance Plot") +
  theme(axis.text.x = element_text(angle = 90, hjust = 1))
```

Variable Importance Plot



```
#problem 4(d)
```

```
# Load the required libraries
library(caret)
library(rpart)

df<- read.csv("Bank_Modified.csv")

# Preprocess
df$approval <- as.factor(df$approval)
df <- df[, !names(df) %in% "id"]

# Initial model
library(rpart)
fit <- rpart(approval ~ ., data = df, control = rpart.control(minsplit = 10, maxdepth = 20))

# Calculate variable importance
variable_importance <- fit$variable.importance
variable_importance
```

```
##          X      bool1      ages      cont4      bool2      cont3
## 203.760218 176.877944 97.586213 87.667367 87.532028 75.420300
## credit.score      cont2      cont5      cont1      cont6
##    7.771536     7.037672   6.319305   5.079393   4.783861
```

```
sorted_importance <- sort(variable_importance, decreasing = TRUE)
sorted_importance
```

```
##          X      bool1      ages      cont4      bool2      cont3
## 203.760218 176.877944 97.586213 87.667367 87.532028 75.420300
## credit.score      cont2      cont5      cont1      cont6
##    7.771536     7.037672   6.319305   5.079393   4.783861
```

```
tree_model_top1 <- rpart(approval ~ ., data = train_data, method = "class", control = rpart.control(minsplit = 10, maxdepth = 20))
```

Make predictions on the test data using the new model

```
predictions_top1 <- predict(tree_model_top1, test_data, type = "class")
```

Evaluate the accuracy of the new model

```
original_accuracy_top1 <- confusionMatrix(predictions_top1, test_data$approval)$overall["Accuracy"]
```

Print the accuracy of the original and new models

```
print(paste("Model with Accuracy:", round(original_accuracy_top1, 2)))
```

```
## [1] "Model with Accuracy: 0.96"
```

Reduced model

Select the top six variables based on importance scores

```
top_vars <- names(sorted_importance)[1:6]
```

```
top_vars
```

```
## [1] "X"      "bool1"   "ages"    "cont4"   "bool2"   "cont3"
```

Create new datasets with only the top six variables

```
train_data_top <- df[, c("approval", top_vars)]
```

```
train_data_top
```

	approval	X	bool1	ages	cont4	bool2	cont3
## 1	+	1	t	58	1	t	1.250
## 2	+	2	t	54	6	t	3.040
## 3	+	3	t	62	0	f	1.500
## 4	+	4	t	51	5	t	3.750
## 5	+	5	t	58	0	f	1.710
## 6	+	6	t	37	0	f	2.500
## 7	+	7	t	47	0	f	6.500
## 8	+	8	t	67	0	f	0.040
## 9	+	9	t	61	0	f	3.960
## 10	+	10	t	62	0	f	3.165
## 11	+	11	f	41	0	f	2.165
## 12	+	12	t	51	0	f	4.335
## 13	+	13	t	51	0	f	1.000
## 14	+	14	f	32	0	f	0.040
## 15	+	15	t	51	7	t	5.000
## 16	+	16	t	59	10	t	0.250
## 17	+	17	t	49	3	t	0.960
## 18	+	18	t	49	10	t	3.170
## 19	+	19	t	46	0	f	0.665
## 20	+	20	t	55	7	t	0.750
## 21	+	21	t	58	17	t	2.500
## 22	+	22	t	43	0	f	0.835
## 23	+	23	t	43	6	t	7.875
## 24	+	24	t	47	1	t	3.085
## 25	+	25	t	43	3	t	0.500
## 26	+	26	t	63	2	t	1.500
## 27	+	27	t	51	9	t	5.165
## 28	+	28	t	45	17	t	15.000
## 29	+	29	t	40	3	t	7.000
## 30	+	30	t	49	6	t	5.000
## 31	+	31	t	38	5	t	5.040
## 32	+	32	t	52	8	t	7.960
## 33	+	33	t	54	15	t	7.585
## 34	+	34	t	42	0	f	5.000
## 35	+	35	t	45	5	t	0.415
## 36	+	36	t	62	11	t	2.000
## 37	+	37	t	50	12	t	1.835
## 38	+	38	t	57	2	t	0.500
## 39	+	39	t	43	2	t	0.250
## 40	+	40	t	59	11	t	14.415
## 41	+	41	t	39	12	t	4.500
## 42	+	42	t	36	11	t	5.335
## 43	+	43	t	61	1	t	0.750
## 44	+	44	t	48	6	t	8.625
## 45	+	45	t	58	40	t	28.500
## 46	+	46	t	61	11	t	2.625
## 47	+	47	t	57	23	t	0.125
## 48	+	48	t	50	3	t	6.040
## 49	+	49	f	48	0	f	3.500
## 50	+	50	f	55	0	f	0.165
## 51	+	51	t	35	0	f	0.875

## 52	+	52	t	45	0	f	1.750
## 53	+	53	t	49	0	f	0.040
## 54	+	54	t	41	0	f	0.000
## 55	+	55	t	51	0	f	7.415
## 56	+	56	t	43	0	f	0.835
## 57	+	57	t	44	0	f	0.085
## 58	+	58	t	35	0	f	5.000
## 59	+	59	f	54	0	f	5.750
## 60	+	60	t	57	11	t	6.000
## 61	+	61	t	52	4	t	1.250
## 62	+	62	t	54	9	t	3.000
## 63	+	63	t	35	2	t	1.500
## 64	+	64	t	35	1	t	1.585
## 65	+	65	t	60	1	t	4.290
## 66	+	66	t	45	1	t	1.540
## 67	+	67	t	54	11	t	2.000
## 68	+	68	t	42	3	t	0.250
## 69	+	69	t	32	7	t	1.460
## 70	+	70	t	46	1	t	1.625
## 71	-	71	t	52	0	f	1.585
## 72	-	72	t	52	0	f	12.500
## 73	-	73	t	58	0	f	13.500
## 74	-	74	t	56	0	f	10.750
## 75	-	75	f	53	0	f	1.625
## 76	-	76	t	52	1	t	0.375
## 77	-	77	t	55	0	f	0.125
## 78	-	78	t	44	0	f	0.585
## 79	-	79	t	51	1	t	2.500
## 80	-	80	t	50	0	f	0.250
## 81	-	81	t	52	1	t	0.000
## 82	-	82	t	52	0	f	2.000
## 83	-	83	t	54	0	f	0.250
## 84	-	84	t	50	0	f	3.000
## 85	-	85	t	54	0	f	0.455
## 86	-	86	t	54	0	f	5.000
## 87	-	87	t	44	0	f	0.875
## 88	-	88	t	36	0	f	4.000
## 89	-	89	t	51	0	f	1.000
## 90	-	90	t	48	0	f	0.000
## 91	-	91	t	40	0	f	5.000
## 92	-	92	t	39	0	f	0.500
## 93	-	93	t	71	0	f	8.500
## 94	-	94	t	55	0	f	9.460
## 95	-	95	t	36	0	f	1.500
## 96	-	96	t	50	0	f	0.500
## 97	-	97	t	84	0	f	0.125
## 98	-	98	t	49	0	f	0.835
## 99	-	99	t	61	0	f	3.000
## 100	-	100	t	71	2	t	1.000
## 101	-	101	t	44	0	f	0.250
## 102	-	102	t	31	0	f	4.000
## 103	-	103	t	40	2	t	0.375

## 104	- 104	t	56	2	t	2.250
## 105	- 105	t	80	2	t	5.750
## 106	- 106	t	49	20	t	0.000
## 107	- 107	t	58	0	f	0.500
## 108	- 108	t	55	0	f	4.500
## 109	- 109	t	45	0	f	10.000
## 110	- 110	t	58	5	t	0.795
## 111	- 111	t	53	3	t	3.500
## 112	- 112	t	56	3	t	0.500
## 113	- 113	t	52	0	f	0.875
## 114	- 114	t	64	3	t	1.000
## 115	- 115	t	34	3	t	1.375
## 116	- 116	t	55	2	t	1.290
## 117	- 117	t	48	7	t	11.500
## 118	+ 118	t	69	15	t	6.290
## 119	+ 119	t	56	6	t	14.000
## 120	+ 120	t	51	1	t	0.335
## 121	+ 121	t	29	1	t	0.040
## 122	+ 122	t	61	67	t	1.210
## 123	+ 123	t	51	12	t	1.500
## 124	+ 124	t	43	3	t	7.375
## 125	+ 125	t	51	5	t	8.500
## 126	+ 126	t	59	6	t	7.500
## 127	+ 127	t	52	12	t	2.500
## 128	+ 128	t	41	7	t	2.500
## 129	+ 129	t	36	2	t	3.250
## 130	+ 130	t	45	0	f	0.835
## 131	+ 131	t	25	1	t	13.000
## 132	+ 132	t	52	1	t	2.250
## 133	+ 133	t	47	6	t	6.500
## 134	+ 134	t	44	6	t	2.500
## 135	+ 135	t	42	12	t	5.500
## 136	+ 136	t	43	0	f	6.000
## 137	+ 137	t	44	3	t	0.500
## 138	+ 138	t	58	6	t	4.250
## 139	+ 139	t	35	6	t	1.625
## 140	+ 140	t	30	2	t	5.000
## 141	+ 141	t	55	9	t	0.625
## 142	+ 142	t	34	15	t	0.000
## 143	+ 143	t	63	8	t	1.750
## 144	+ 144	t	44	1	t	2.000
## 145	+ 145	t	41	9	t	5.085
## 146	+ 146	t	51	6	t	2.750
## 147	+ 147	t	57	3	t	2.375
## 148	+ 148	t	50	14	t	8.000
## 149	+ 149	t	33	7	t	4.000
## 150	+ 150	t	29	14	t	5.500
## 151	+ 151	t	53	11	t	0.415
## 152	+ 152	t	74	14	t	4.000
## 153	+ 153	t	47	12	t	4.250
## 154	+ 154	t	51	11	t	1.085
## 155	+ 155	t	74	3	t	5.500

## 156	+ 156	t	42	11	t	0.000
## 157	+ 157	t	45	1	t	2.540
## 158	+ 158	t	41	14	t	0.000
## 159	+ 159	t	52	2	t	4.165
## 160	+ 160	t	57	1	t	0.040
## 161	+ 161	t	36	4	t	1.000
## 162	+ 162	t	58	2	t	1.750
## 163	+ 163	t	43	1	t	1.665
## 164	+ 164	t	58	0	f	0.040
## 165	+ 165	t	50	0	f	11.000
## 166	+ 166	t	50	0	f	1.750
## 167	+ 167	t	46	0	f	1.000
## 168	+ 168	t	46	0	f	0.040
## 169	+ 169	t	50	0	f	9.000
## 170	+ 170	f	49	0	f	1.500
## 171	+ 171	t	58	0	f	0.250
## 172	+ 172	t	40	0	f	15.000
## 173	+ 173	t	39	0	f	8.000
## 174	+ 174	t	43	0	f	8.500
## 175	+ 175	t	43	0	f	1.335
## 176	+ 176	t	49	0	f	0.375
## 177	+ 177	t	41	0	f	3.000
## 178	+ 178	t	46	0	f	1.415
## 179	+ 179	t	55	4	t	1.210
## 180	+ 180	t	56	14	t	1.960
## 181	+ 181	t	59	20	t	15.000
## 182	+ 182	t	62	4	t	0.500
## 183	+ 183	t	57	3	t	0.165
## 184	+ 184	t	37	7	t	5.500
## 185	+ 185	t	52	7	t	2.585
## 186	+ 186	t	48	9	t	12.500
## 187	+ 187	t	37	1	t	3.500
## 188	+ 188	t	66	7	t	5.000
## 189	+ 189	t	37	5	t	2.500
## 190	+ 190	t	48	2	t	1.625
## 191	+ 191	t	47	0	f	3.000
## 192	+ 192	t	47	0	f	5.125
## 193	+ 193	t	64	0	f	2.500
## 194	+ 194	t	45	6	t	3.085
## 195	+ 195	t	47	7	t	8.500
## 196	+ 196	t	46	8	t	1.500
## 197	+ 197	t	55	3	t	3.165
## 198	+ 198	t	44	12	t	15.500
## 199	+ 199	t	54	3	t	2.000
## 200	+ 200	t	53	9	t	0.040
## 201	+ 201	t	43	1	t	1.250
## 202	+ 202	t	46	0	f	2.250
## 203	+ 203	t	41	6	t	2.250
## 204	+ 204	t	55	2	t	0.710
## 205	+ 205	t	43	1	t	0.085
## 206	+ 206	t	39	8	t	14.000
## 207	+ 207	f	55	0	f	0.000

## 208	+ 208	t	62	6	t	5.665
## 209	+ 209	t	30	7	t	4.500
## 210	+ 210	t	27	16	t	6.500
## 211	+ 211	t	47	14	t	10.000
## 212	+ 212	t	29	0	f	5.500
## 213	+ 213	t	43	15	t	18.000
## 214	+ 214	t	55	9	t	3.500
## 215	+ 215	t	47	1	t	5.250
## 216	+ 216	t	49	0	f	3.500
## 217	+ 217	t	50	8	t	7.000
## 218	+ 218	t	38	5	t	5.000
## 219	+ 219	t	47	5	t	8.665
## 220	+ 220	t	57	4	t	1.000
## 221	+ 221	t	46	3	t	2.290
## 222	+ 222	t	61	7	t	20.000
## 223	+ 223	t	41	0	f	1.375
## 224	+ 224	t	54	0	f	0.085
## 225	+ 225	t	50	0	f	0.125
## 226	+ 226	t	43	0	f	0.250
## 227	+ 227	t	50	0	f	0.500
## 228	+ 228	f	41	0	f	2.460
## 229	+ 229	t	50	2	t	2.000
## 230	+ 230	t	58	0	f	0.665
## 231	+ 231	t	34	7	t	0.625
## 232	+ 232	t	29	2	t	13.875
## 233	+ 233	t	37	4	t	4.500
## 234	+ 234	t	25	0	f	5.750
## 235	+ 235	t	31	13	t	10.000
## 236	+ 236	t	33	5	t	2.085
## 237	+ 237	t	22	0	f	0.000
## 238	+ 238	t	26	1	t	1.415
## 239	+ 239	t	33	0	f	4.580
## 240	+ 240	t	36	6	t	2.500
## 241	+ 241	t	40	0	f	2.500
## 242	+ 242	t	32	3	t	1.750
## 243	+ 243	t	34	0	f	11.000
## 244	+ 244	t	27	5	t	2.710
## 245	+ 245	t	27	2	t	1.500
## 246	+ 246	t	33	1	t	2.040
## 247	+ 247	t	29	1	t	14.000
## 248	+ 248	t	35	11	t	0.290
## 249	+ 249	t	24	2	t	4.750
## 250	+ 250	t	20	6	t	0.290
## 251	+ 251	t	26	11	t	20.000
## 252	+ 252	t	31	6	t	5.000
## 253	+ 253	t	29	11	t	1.000
## 254	+ 254	t	25	1	t	0.460
## 255	- 255	f	22	0	f	0.250
## 256	- 256	f	33	0	f	1.085
## 257	- 257	f	25	0	f	2.000
## 258	- 258	f	28	0	f	0.500
## 259	- 259	f	33	0	f	0.040

## 260	- 260	f	34	0	f	0.165
## 261	- 261	f	27	0	f	5.750
## 262	- 262	f	31	0	f	0.000
## 263	- 263	f	35	0	f	0.335
## 264	- 264	f	24	0	f	0.000
## 265	- 265	f	38	0	f	0.000
## 266	- 266	f	26	0	f	0.040
## 267	- 267	f	38	0	f	0.000
## 268	- 268	f	30	0	f	1.250
## 269	+ 269	t	24	0	f	0.125
## 270	+ 270	f	24	0	f	0.210
## 271	+ 271	f	30	0	f	0.000
## 272	- 272	f	38	0	f	1.250
## 273	- 273	f	32	0	f	0.040
## 274	- 274	f	29	0	f	0.125
## 275	- 275	f	27	0	f	2.250
## 276	- 276	f	30	0	f	0.540
## 277	- 277	f	26	0	f	0.290
## 278	- 278	f	30	0	f	0.165
## 279	- 279	f	25	0	f	0.000
## 280	- 280	t	19	0	f	0.085
## 281	- 281	f	32	0	f	0.250
## 282	- 282	f	34	0	f	0.125
## 283	- 283	f	38	0	f	0.250
## 284	- 284	f	29	1	t	0.250
## 285	- 285	f	28	2	t	0.125
## 286	- 286	f	21	1	t	0.165
## 287	- 287	f	21	2	t	0.000
## 288	- 288	f	27	1	t	0.290
## 289	- 289	f	24	1	t	0.165
## 290	- 290	f	32	0	f	0.000
## 291	- 291	f	25	0	f	0.500
## 292	- 292	f	33	1	t	1.000
## 293	- 293	f	33	1	t	0.165
## 294	- 294	f	27	2	t	0.125
## 295	- 295	f	19	1	t	0.000
## 296	- 296	f	32	2	t	3.040
## 297	- 297	f	36	1	t	4.000
## 298	- 298	f	30	2	t	1.750
## 299	- 299	f	25	1	t	0.665
## 300	- 300	f	27	2	t	3.335
## 301	- 301	f	36	1	t	6.500
## 302	- 302	f	29	0	f	0.250
## 303	- 303	f	30	0	f	0.500
## 304	- 304	f	32	0	f	0.085
## 305	- 305	f	29	0	f	1.500
## 306	- 306	t	31	0	f	0.000
## 307	- 307	f	31	0	f	4.500
## 308	- 308	f	34	0	f	0.415
## 309	- 309	f	45	0	f	0.250
## 310	- 310	f	30	0	f	0.000
## 311	- 311	f	30	0	f	1.000

## 312	- 312	f	35	0	f	2.335
## 313	- 313	f	21	0	f	0.125
## 314	- 314	f	32	0	f	0.415
## 315	- 315	f	20	0	f	0.250
## 316	- 316	t	24	0	f	0.500
## 317	- 317	f	21	0	f	0.250
## 318	+ 318	f	28	0	f	0.000
## 319	+ 319	f	39	0	f	0.000
## 320	+ 320	f	27	0	f	1.500
## 321	+ 321	f	29	0	f	1.500
## 322	+ 322	f	34	0	f	10.000
## 323	+ 323	f	34	0	f	0.375
## 324	+ 324	t	34	11	t	0.250
## 325	- 325	f	28	0	f	1.165
## 326	- 326	f	36	0	f	1.000
## 327	- 327	f	31	0	f	0.040
## 328	- 328	f	30	0	f	0.500
## 329	- 329	f	34	0	f	3.000
## 330	- 330	f	24	0	f	0.085
## 331	- 331	f	28	0	f	0.000
## 332	- 332	f	28	0	f	2.500
## 333	- 333	f	23	0	f	1.000
## 334	- 334	f	27	0	f	1.000
## 335	- 335	f	21	0	f	0.500
## 336	- 336	f	27	0	f	0.165
## 337	- 337	f	35	0	f	1.000
## 338	- 338	f	29	0	f	0.500
## 339	- 339	f	29	0	f	2.000
## 340	- 340	f	31	0	f	0.750
## 341	- 341	f	32	0	f	3.000
## 342	- 342	f	18	0	f	0.040
## 343	- 343	f	32	0	f	0.500
## 344	- 344	f	30	0	f	0.000
## 345	- 345	f	23	0	f	0.500
## 346	- 346	f	30	0	f	0.000
## 347	- 347	f	39	0	f	0.250
## 348	- 348	f	32	0	f	2.500
## 349	- 349	t	27	3	t	0.585
## 350	- 350	f	27	1	t	2.250
## 351	- 351	f	33	0	f	0.000
## 352	- 352	f	42	0	f	0.000
## 353	- 353	f	25	0	f	1.500
## 354	- 354	f	32	0	f	0.585
## 355	- 355	f	27	0	f	0.250
## 356	- 356	f	26	2	t	1.000
## 357	- 357	f	26	0	f	0.165
## 358	- 358	f	35	0	f	0.040
## 359	- 359	f	29	0	f	0.165
## 360	- 360	f	24	0	f	0.000
## 361	- 361	f	25	0	f	5.500
## 362	- 362	f	27	0	f	0.085
## 363	- 363	f	28	0	f	0.000

## 364	- 364	f	31	0	f	0.290
## 365	- 365	f	25	2	t	0.165
## 366	- 366	f	31	1	t	13.875
## 367	- 367	f	30	0	f	0.165
## 368	- 368	f	27	0	f	0.165
## 369	- 369	f	24	0	f	3.000
## 370	- 370	f	32	0	f	0.750
## 371	- 371	f	23	0	f	7.000
## 372	- 372	f	31	0	f	0.000
## 373	- 373	f	39	0	f	1.000
## 374	- 374	f	32	0	f	0.125
## 375	- 375	f	28	0	f	0.040
## 376	- 376	f	29	0	f	1.000
## 377	- 377	f	28	0	f	0.125
## 378	- 378	f	29	0	f	2.000
## 379	- 379	f	35	0	f	0.125
## 380	- 380	f	34	0	f	4.000
## 381	- 381	f	17	0	f	2.250
## 382	- 382	f	32	0	f	0.165
## 383	- 383	f	27	0	f	4.500
## 384	- 384	f	25	0	f	5.000
## 385	- 385	f	30	0	f	1.585
## 386	- 386	f	26	0	f	1.500
## 387	- 387	f	27	0	f	0.540
## 388	- 388	f	33	0	f	0.500
## 389	- 389	f	21	0	f	0.000
## 390	- 390	f	36	0	f	0.085
## 391	- 391	f	28	0	f	1.000
## 392	- 392	f	36	0	f	0.210
## 393	- 393	f	30	0	f	0.250
## 394	- 394	f	28	0	f	1.000
## 395	- 395	f	31	0	f	0.250
## 396	- 396	f	26	0	f	0.540
## 397	- 397	f	33	0	f	0.040
## 398	- 398	f	33	0	f	0.125
## 399	- 399	f	25	0	f	1.250
## 400	- 400	f	34	0	f	0.085
## 401	- 401	f	34	0	f	0.290
## 402	- 402	f	34	0	f	0.290
## 403	- 403	f	33	0	f	3.085
## 404	- 404	f	23	0	f	0.750
## 405	- 405	f	27	0	f	1.085
## 406	- 406	f	30	0	f	0.000
## 407	- 407	f	31	2	t	0.165
## 408	- 408	f	45	1	t	1.000
## 409	- 409	f	33	1	t	0.085
## 410	- 410	f	23	4	t	0.335
## 411	- 411	f	34	5	t	0.000
## 412	- 412	f	31	1	t	1.250
## 413	- 413	f	29	0	f	0.085
## 414	- 414	f	30	0	f	0.000
## 415	- 415	f	28	0	f	0.125

## 416	- 416	f	29	0	f	3.250
## 417	- 417	f	26	0	f	0.125
## 418	- 418	f	33	0	f	0.540
## 419	- 419	f	35	2	t	0.375
## 420	- 420	f	36	0	f	0.000
## 421	- 421	f	28	0	f	1.000
## 422	- 422	f	39	0	f	1.500
## 423	- 423	f	31	0	f	1.750
## 424	- 424	f	24	0	f	1.165
## 425	- 425	f	26	0	f	1.500
## 426	- 426	f	30	0	f	0.250
## 427	- 427	f	34	0	f	0.250
## 428	- 428	f	39	0	f	0.040
## 429	- 429	f	26	0	f	0.290
## 430	- 430	f	30	0	f	0.085
## 431	- 431	f	34	0	f	1.500
## 432	- 432	f	34	0	f	0.165
## 433	- 433	f	31	0	f	0.085
## 434	- 434	f	31	0	f	0.500
## 435	- 435	f	33	0	f	2.415
## 436	- 436	f	33	4	t	0.000
## 437	- 437	f	36	3	t	0.000
## 438	- 438	f	26	0	f	0.000
## 439	- 439	f	24	1	t	0.000
## 440	- 440	f	33	2	t	0.375
## 441	- 441	f	32	11	t	1.000
## 442	- 442	f	31	2	t	0.000
## 443	- 443	f	32	0	f	0.125
## 444	- 444	f	26	0	f	0.040
## 445	- 445	f	29	0	f	0.000
## 446	- 446	f	29	0	f	0.000
## 447	- 447	f	33	0	f	0.165
## 448	- 448	f	26	0	f	0.000
## 449	- 449	f	27	1	t	0.000
## 450	- 450	f	32	0	f	0.500
## 451	- 451	f	39	0	f	7.000
## 452	- 452	f	29	0	f	1.500
## 453	- 453	f	27	0	f	3.500
## 454	- 454	f	32	0	f	0.250
## 455	- 455	f	29	0	f	3.750
## 456	- 456	f	27	0	f	0.085
## 457	- 457	f	34	0	f	0.000
## 458	- 458	f	27	0	f	0.040
## 459	- 459	f	36	0	f	5.000
## 460	- 460	f	28	0	f	1.500
## 461	- 461	f	27	0	f	0.000
## 462	- 462	f	48	4	t	0.085
## 463	- 463	f	44	0	f	0.125
## 464	- 464	f	54	10	t	0.000
## 465	- 465	f	30	1	t	0.000
## 466	- 466	f	44	1	t	2.790
## 467	- 467	f	38	2	t	2.500

## 468	- 468	f	41	3	t	0.040
## 469	- 469	f	38	0	f	0.750
## 470	- 470	f	43	0	f	0.415
## 471	- 471	f	42	0	f	0.085
## 472	- 472	f	46	0	f	0.040
## 473	- 473	f	34	0	f	0.125
## 474	- 474	f	51	0	f	1.000
## 475	- 475	f	37	0	f	0.125
## 476	- 476	f	48	0	f	0.750
## 477	- 477	f	43	0	f	0.085
## 478	- 478	f	40	0	f	10.000
## 479	- 479	f	44	0	f	0.415
## 480	- 480	f	40	0	f	0.085
## 481	- 481	f	36	6	t	0.165
## 482	- 482	f	37	1	t	0.415
## 483	- 483	f	34	10	t	1.750
## 484	- 484	f	40	2	t	0.040
## 485	- 485	f	33	0	f	1.165
## 486	- 486	f	41	2	t	0.040
## 487	- 487	f	49	0	f	0.085
## 488	- 488	f	35	0	f	0.040
## 489	- 489	f	38	0	f	0.000
## 490	- 490	f	32	0	f	0.125
## 491	+ 491	t	35	1	t	2.750
## 492	+ 492	t	38	2	t	4.625
## 493	+ 493	t	41	14	t	6.500
## 494	+ 494	t	42	0	f	6.000
## 495	+ 495	t	43	0	f	3.000
## 496	+ 496	t	27	0	f	1.500
## 497	+ 497	t	47	0	f	1.040
## 498	+ 498	t	37	3	t	1.665
## 499	+ 499	t	46	5	t	1.460
## 500	+ 500	t	44	3	t	1.625
## 501	+ 501	t	30	3	t	5.000
## 502	+ 502	t	36	10	t	3.500
## 503	+ 503	t	53	1	t	0.000
## 504	+ 504	t	43	2	t	4.750
## 505	+ 505	t	32	1	t	1.085
## 506	+ 506	t	34	16	t	7.000
## 507	+ 507	t	45	2	t	0.750
## 508	+ 508	t	32	19	t	1.835
## 509	+ 509	t	29	1	t	2.000
## 510	+ 510	t	40	1	t	2.250
## 511	+ 511	t	35	2	t	1.750
## 512	+ 512	t	42	0	f	0.000
## 513	+ 513	t	31	0	f	2.500
## 514	+ 514	t	34	0	f	0.000
## 515	+ 515	t	40	0	f	2.585
## 516	+ 516	t	24	0	f	6.500
## 517	+ 517	t	49	4	t	4.000
## 518	+ 518	t	53	5	t	1.750
## 519	+ 519	t	36	4	t	0.585

## 520	+ 520	t	32	5	t	0.125
## 521	+ 521	t	37	1	t	1.500
## 522	+ 522	t	47	5	t	2.250
## 523	+ 523	t	39	1	t	1.290
## 524	- 524	t	54	10	t	1.750
## 525	- 525	t	32	0	f	2.415
## 526	- 526	t	34	0	f	2.500
## 527	- 527	t	36	0	f	0.210
## 528	- 528	t	36	0	f	1.000
## 529	- 529	t	53	3	t	6.750
## 530	- 530	t	50	1	t	0.210
## 531	- 531	t	36	0	f	2.750
## 532	- 532	t	57	0	f	1.750
## 533	- 533	t	52	0	f	0.750
## 534	- 534	t	32	0	f	0.000
## 535	- 535	t	53	0	f	7.500
## 536	- 536	t	47	0	f	0.000
## 537	- 537	t	22	0	f	0.000
## 538	- 538	t	49	0	f	3.750
## 539	- 539	t	45	0	f	0.250
## 540	- 540	t	36	0	f	0.540
## 541	- 541	t	40	0	f	2.000
## 542	- 542	t	31	0	f	1.000
## 543	- 543	t	51	0	f	0.835
## 544	- 544	t	40	0	f	1.165
## 545	- 545	t	45	10	t	0.500
## 546	- 546	t	39	0	f	1.500
## 547	- 547	t	43	6	t	2.625
## 548	+ 548	t	33	6	t	1.875
## 549	+ 549	t	33	7	t	0.750
## 550	+ 550	t	49	0	f	16.000
## 551	+ 551	t	43	1	t	12.750
## 552	+ 552	t	56	11	t	0.000
## 553	+ 553	t	47	9	t	5.375
## 554	+ 554	t	42	14	t	4.000
## 555	+ 555	t	39	4	t	0.750
## 556	+ 556	t	43	6	t	0.210
## 557	+ 557	t	45	2	t	7.500
## 558	+ 558	t	40	16	t	1.085
## 559	+ 559	t	59	0	f	0.040
## 560	+ 560	t	29	7	t	2.290
## 561	+ 561	t	30	6	t	3.500
## 562	+ 562	t	41	0	f	1.250
## 563	+ 563	t	42	0	f	1.415
## 564	+ 564	t	44	0	f	1.585
## 565	+ 565	t	47	0	f	12.750
## 566	+ 566	t	22	0	f	0.040
## 567	+ 567	t	24	11	t	2.125
## 568	+ 568	t	47	0	f	0.875
## 569	+ 569	t	62	8	t	0.375
## 570	+ 570	t	49	4	t	0.750
## 571	+ 571	t	42	5	t	1.750

## 572	+ 572	t	39	8	t	1.085
## 573	+ 573	t	34	1	t	0.040
## 574	+ 574	t	44	11	t	0.000
## 575	+ 575	t	47	4	t	1.000
## 576	+ 576	t	34	1	t	3.250
## 577	+ 577	t	45	11	t	1.750
## 578	+ 578	t	44	3	t	1.000
## 579	+ 579	t	45	10	t	1.500
## 580	+ 580	t	43	5	t	1.290
## 581	+ 581	t	44	8	t	1.335
## 582	+ 582	f	37	1	t	0.040
## 583	+ 583	t	29	0	f	0.125
## 584	+ 584	t	42	0	f	5.250
## 585	+ 585	t	44	0	f	0.000
## 586	+ 586	t	26	0	f	0.000
## 587	+ 587	t	44	9	t	17.500
## 588	+ 588	t	53	9	t	8.500
## 589	+ 589	t	46	5	t	1.000
## 590	+ 590	t	34	7	t	0.290
## 591	+ 591	t	45	8	t	3.125
## 592	+ 592	t	25	3	t	4.250
## 593	+ 593	f	46	0	f	0.000
## 594	+ 594	f	38	0	f	0.085
## 595	+ 595	t	37	0	f	0.085
## 596	+ 596	t	45	0	f	0.250
## 597	+ 597	t	46	8	t	2.375
## 598	+ 598	t	51	3	t	2.500
## 599	+ 599	f	36	1	t	1.000
## 600	+ 600	t	40	11	t	2.000
## 601	+ 601	t	42	4	t	0.540
## 602	- 602	f	42	0	f	0.000
## 603	- 603	f	37	0	f	0.250
## 604	- 604	f	38	0	f	0.125
## 605	- 605	t	34	0	f	0.085
## 606	- 606	f	32	0	f	1.250
## 607	+ 607	f	36	0	f	0.040
## 608	- 608	f	39	0	f	0.500
## 609	- 609	f	44	0	f	4.250
## 610	- 610	f	44	0	f	0.085
## 611	- 611	f	32	0	f	0.125
## 612	- 612	f	37	2	t	5.085
## 613	- 613	f	45	1	t	0.290
## 614	- 614	f	42	2	t	0.585
## 615	- 615	f	57	0	f	0.125
## 616	- 616	f	33	2	t	0.250
## 617	- 617	f	42	1	t	1.585
## 618	- 618	f	32	2	t	0.000
## 619	- 619	f	52	1	t	2.000
## 620	- 620	t	34	0	f	0.125
## 621	- 621	f	47	0	f	0.125
## 622	+ 622	f	42	0	f	2.250
## 623	+ 623	f	45	0	f	0.000

## 624	- 624	f	39	0	f	0.665
## 625	- 625	f	43	0	f	0.665
## 626	- 626	f	49	0	f	2.085
## 627	- 627	f	34	0	f	0.165
## 628	- 628	f	39	0	f	0.000
## 629	- 629	f	40	0	f	0.500
## 630	- 630	f	45	0	f	1.665
## 631	- 631	f	42	0	f	0.250
## 632	- 632	f	39	1	t	0.125
## 633	- 633	f	37	0	f	0.000
## 634	- 634	f	26	0	f	0.000
## 635	- 635	f	26	1	t	0.250
## 636	- 636	f	40	2	t	0.960
## 637	- 637	f	49	0	f	0.500
## 638	- 638	f	30	0	f	0.790
## 639	- 639	f	34	0	f	0.250
## 640	- 640	f	43	0	f	1.500
## 641	- 641	f	40	0	f	2.500
## 642	- 642	f	33	0	f	3.500
## 643	- 643	f	41	0	f	3.500
## 644	- 644	f	44	0	f	3.000
## 645	- 645	f	28	0	f	0.290
## 646	- 646	f	37	0	f	0.165
## 647	- 647	f	38	0	f	0.165
## 648	- 648	f	30	0	f	0.250
## 649	- 649	f	37	0	f	3.500
## 650	- 650	f	33	6	t	0.000
## 651	- 651	f	48	0	f	1.000
## 652	- 652	f	43	1	t	0.125
## 653	- 653	f	36	0	f	0.335
## 654	- 654	t	31	0	f	0.500
## 655	- 655	f	33	1	t	0.415
## 656	- 656	f	28	0	f	0.000
## 657	- 657	f	49	1	t	2.290
## 658	- 658	f	45	0	f	0.250
## 659	- 659	f	41	0	f	1.000
## 660	- 660	f	35	1	t	0.250
## 661	- 661	f	49	0	f	0.085
## 662	- 662	f	39	0	f	0.165
## 663	- 663	f	36	0	f	0.875
## 664	- 664	f	36	0	f	1.500
## 665	- 665	f	38	0	f	0.040
## 666	- 666	f	38	0	f	0.040
## 667	- 667	f	29	0	f	0.250
## 668	- 668	f	40	1	t	1.750
## 669	- 669	f	33	0	f	0.085
## 670	- 670	f	43	0	f	1.500
## 671	- 671	f	31	0	f	5.500
## 672	- 672	f	47	0	f	0.500
## 673	- 673	f	27	0	f	0.500
## 674	- 674	f	46	0	f	2.000
## 675	- 675	f	34	0	f	0.210

## 676	- 676	f	40	0	f	0.665
## 677	- 677	f	43	12	t	0.085
## 678	- 678	f	36	1	t	0.040
## 679	- 679	f	35	0	f	0.000
## 680	- 680	f	35	0	f	0.000
## 681	- 681	f	39	0	f	0.290
## 682	- 682	f	48	0	f	3.000
## 683	- 683	f	38	0	f	0.335
## 684	- 684	f	41	0	f	0.585
## 685	- 685	f	25	0	f	3.500
## 686	- 686	f	36	0	f	1.250
## 687	- 687	f	32	2	t	2.000
## 688	- 688	f	38	1	t	2.000
## 689	- 689	f	35	0	f	0.040
## 690	- 690	f	45	0	f	8.290

```
test_data_top <- df[, c("approval", top_vars)]  
test_data_top
```

```

## approval X bool1 ages cont4 bool2 cont3
## 1 + 1 t 58 1 t 1.250
## 2 + 2 t 54 6 t 3.040
## 3 + 3 t 62 0 f 1.500
## 4 + 4 t 51 5 t 3.750
## 5 + 5 t 58 0 f 1.710
## 6 + 6 t 37 0 f 2.500
## 7 + 7 t 47 0 f 6.500
## 8 + 8 t 67 0 f 0.040
## 9 + 9 t 61 0 f 3.960
## 10 + 10 t 62 0 f 3.165
## 11 + 11 f 41 0 f 2.165
## 12 + 12 t 51 0 f 4.335
## 13 + 13 t 51 0 f 1.000
## 14 + 14 f 32 0 f 0.040
## 15 + 15 t 51 7 t 5.000
## 16 + 16 t 59 10 t 0.250
## 17 + 17 t 49 3 t 0.960
## 18 + 18 t 49 10 t 3.170
## 19 + 19 t 46 0 f 0.665
## 20 + 20 t 55 7 t 0.750
## 21 + 21 t 58 17 t 2.500
## 22 + 22 t 43 0 f 0.835
## 23 + 23 t 43 6 t 7.875
## 24 + 24 t 47 1 t 3.085
## 25 + 25 t 43 3 t 0.500
## 26 + 26 t 63 2 t 1.500
## 27 + 27 t 51 9 t 5.165
## 28 + 28 t 45 17 t 15.000
## 29 + 29 t 40 3 t 7.000
## 30 + 30 t 49 6 t 5.000
## 31 + 31 t 38 5 t 5.040
## 32 + 32 t 52 8 t 7.960
## 33 + 33 t 54 15 t 7.585
## 34 + 34 t 42 0 f 5.000
## 35 + 35 t 45 5 t 0.415
## 36 + 36 t 62 11 t 2.000
## 37 + 37 t 50 12 t 1.835
## 38 + 38 t 57 2 t 0.500
## 39 + 39 t 43 2 t 0.250
## 40 + 40 t 59 11 t 14.415
## 41 + 41 t 39 12 t 4.500
## 42 + 42 t 36 11 t 5.335
## 43 + 43 t 61 1 t 0.750
## 44 + 44 t 48 6 t 8.625
## 45 + 45 t 58 40 t 28.500
## 46 + 46 t 61 11 t 2.625
## 47 + 47 t 57 23 t 0.125
## 48 + 48 t 50 3 t 6.040
## 49 + 49 f 48 0 f 3.500
## 50 + 50 f 55 0 f 0.165
## 51 + 51 t 35 0 f 0.875

```

## 52	+	52	t	45	0	f	1.750
## 53	+	53	t	49	0	f	0.040
## 54	+	54	t	41	0	f	0.000
## 55	+	55	t	51	0	f	7.415
## 56	+	56	t	43	0	f	0.835
## 57	+	57	t	44	0	f	0.085
## 58	+	58	t	35	0	f	5.000
## 59	+	59	f	54	0	f	5.750
## 60	+	60	t	57	11	t	6.000
## 61	+	61	t	52	4	t	1.250
## 62	+	62	t	54	9	t	3.000
## 63	+	63	t	35	2	t	1.500
## 64	+	64	t	35	1	t	1.585
## 65	+	65	t	60	1	t	4.290
## 66	+	66	t	45	1	t	1.540
## 67	+	67	t	54	11	t	2.000
## 68	+	68	t	42	3	t	0.250
## 69	+	69	t	32	7	t	1.460
## 70	+	70	t	46	1	t	1.625
## 71	-	71	t	52	0	f	1.585
## 72	-	72	t	52	0	f	12.500
## 73	-	73	t	58	0	f	13.500
## 74	-	74	t	56	0	f	10.750
## 75	-	75	f	53	0	f	1.625
## 76	-	76	t	52	1	t	0.375
## 77	-	77	t	55	0	f	0.125
## 78	-	78	t	44	0	f	0.585
## 79	-	79	t	51	1	t	2.500
## 80	-	80	t	50	0	f	0.250
## 81	-	81	t	52	1	t	0.000
## 82	-	82	t	52	0	f	2.000
## 83	-	83	t	54	0	f	0.250
## 84	-	84	t	50	0	f	3.000
## 85	-	85	t	54	0	f	0.455
## 86	-	86	t	54	0	f	5.000
## 87	-	87	t	44	0	f	0.875
## 88	-	88	t	36	0	f	4.000
## 89	-	89	t	51	0	f	1.000
## 90	-	90	t	48	0	f	0.000
## 91	-	91	t	40	0	f	5.000
## 92	-	92	t	39	0	f	0.500
## 93	-	93	t	71	0	f	8.500
## 94	-	94	t	55	0	f	9.460
## 95	-	95	t	36	0	f	1.500
## 96	-	96	t	50	0	f	0.500
## 97	-	97	t	84	0	f	0.125
## 98	-	98	t	49	0	f	0.835
## 99	-	99	t	61	0	f	3.000
## 100	-	100	t	71	2	t	1.000
## 101	-	101	t	44	0	f	0.250
## 102	-	102	t	31	0	f	4.000
## 103	-	103	t	40	2	t	0.375

## 104	- 104	t	56	2	t	2.250
## 105	- 105	t	80	2	t	5.750
## 106	- 106	t	49	20	t	0.000
## 107	- 107	t	58	0	f	0.500
## 108	- 108	t	55	0	f	4.500
## 109	- 109	t	45	0	f	10.000
## 110	- 110	t	58	5	t	0.795
## 111	- 111	t	53	3	t	3.500
## 112	- 112	t	56	3	t	0.500
## 113	- 113	t	52	0	f	0.875
## 114	- 114	t	64	3	t	1.000
## 115	- 115	t	34	3	t	1.375
## 116	- 116	t	55	2	t	1.290
## 117	- 117	t	48	7	t	11.500
## 118	+ 118	t	69	15	t	6.290
## 119	+ 119	t	56	6	t	14.000
## 120	+ 120	t	51	1	t	0.335
## 121	+ 121	t	29	1	t	0.040
## 122	+ 122	t	61	67	t	1.210
## 123	+ 123	t	51	12	t	1.500
## 124	+ 124	t	43	3	t	7.375
## 125	+ 125	t	51	5	t	8.500
## 126	+ 126	t	59	6	t	7.500
## 127	+ 127	t	52	12	t	2.500
## 128	+ 128	t	41	7	t	2.500
## 129	+ 129	t	36	2	t	3.250
## 130	+ 130	t	45	0	f	0.835
## 131	+ 131	t	25	1	t	13.000
## 132	+ 132	t	52	1	t	2.250
## 133	+ 133	t	47	6	t	6.500
## 134	+ 134	t	44	6	t	2.500
## 135	+ 135	t	42	12	t	5.500
## 136	+ 136	t	43	0	f	6.000
## 137	+ 137	t	44	3	t	0.500
## 138	+ 138	t	58	6	t	4.250
## 139	+ 139	t	35	6	t	1.625
## 140	+ 140	t	30	2	t	5.000
## 141	+ 141	t	55	9	t	0.625
## 142	+ 142	t	34	15	t	0.000
## 143	+ 143	t	63	8	t	1.750
## 144	+ 144	t	44	1	t	2.000
## 145	+ 145	t	41	9	t	5.085
## 146	+ 146	t	51	6	t	2.750
## 147	+ 147	t	57	3	t	2.375
## 148	+ 148	t	50	14	t	8.000
## 149	+ 149	t	33	7	t	4.000
## 150	+ 150	t	29	14	t	5.500
## 151	+ 151	t	53	11	t	0.415
## 152	+ 152	t	74	14	t	4.000
## 153	+ 153	t	47	12	t	4.250
## 154	+ 154	t	51	11	t	1.085
## 155	+ 155	t	74	3	t	5.500

## 156	+ 156	t	42	11	t	0.000
## 157	+ 157	t	45	1	t	2.540
## 158	+ 158	t	41	14	t	0.000
## 159	+ 159	t	52	2	t	4.165
## 160	+ 160	t	57	1	t	0.040
## 161	+ 161	t	36	4	t	1.000
## 162	+ 162	t	58	2	t	1.750
## 163	+ 163	t	43	1	t	1.665
## 164	+ 164	t	58	0	f	0.040
## 165	+ 165	t	50	0	f	11.000
## 166	+ 166	t	50	0	f	1.750
## 167	+ 167	t	46	0	f	1.000
## 168	+ 168	t	46	0	f	0.040
## 169	+ 169	t	50	0	f	9.000
## 170	+ 170	f	49	0	f	1.500
## 171	+ 171	t	58	0	f	0.250
## 172	+ 172	t	40	0	f	15.000
## 173	+ 173	t	39	0	f	8.000
## 174	+ 174	t	43	0	f	8.500
## 175	+ 175	t	43	0	f	1.335
## 176	+ 176	t	49	0	f	0.375
## 177	+ 177	t	41	0	f	3.000
## 178	+ 178	t	46	0	f	1.415
## 179	+ 179	t	55	4	t	1.210
## 180	+ 180	t	56	14	t	1.960
## 181	+ 181	t	59	20	t	15.000
## 182	+ 182	t	62	4	t	0.500
## 183	+ 183	t	57	3	t	0.165
## 184	+ 184	t	37	7	t	5.500
## 185	+ 185	t	52	7	t	2.585
## 186	+ 186	t	48	9	t	12.500
## 187	+ 187	t	37	1	t	3.500
## 188	+ 188	t	66	7	t	5.000
## 189	+ 189	t	37	5	t	2.500
## 190	+ 190	t	48	2	t	1.625
## 191	+ 191	t	47	0	f	3.000
## 192	+ 192	t	47	0	f	5.125
## 193	+ 193	t	64	0	f	2.500
## 194	+ 194	t	45	6	t	3.085
## 195	+ 195	t	47	7	t	8.500
## 196	+ 196	t	46	8	t	1.500
## 197	+ 197	t	55	3	t	3.165
## 198	+ 198	t	44	12	t	15.500
## 199	+ 199	t	54	3	t	2.000
## 200	+ 200	t	53	9	t	0.040
## 201	+ 201	t	43	1	t	1.250
## 202	+ 202	t	46	0	f	2.250
## 203	+ 203	t	41	6	t	2.250
## 204	+ 204	t	55	2	t	0.710
## 205	+ 205	t	43	1	t	0.085
## 206	+ 206	t	39	8	t	14.000
## 207	+ 207	f	55	0	f	0.000

## 208	+ 208	t	62	6	t	5.665
## 209	+ 209	t	30	7	t	4.500
## 210	+ 210	t	27	16	t	6.500
## 211	+ 211	t	47	14	t	10.000
## 212	+ 212	t	29	0	f	5.500
## 213	+ 213	t	43	15	t	18.000
## 214	+ 214	t	55	9	t	3.500
## 215	+ 215	t	47	1	t	5.250
## 216	+ 216	t	49	0	f	3.500
## 217	+ 217	t	50	8	t	7.000
## 218	+ 218	t	38	5	t	5.000
## 219	+ 219	t	47	5	t	8.665
## 220	+ 220	t	57	4	t	1.000
## 221	+ 221	t	46	3	t	2.290
## 222	+ 222	t	61	7	t	20.000
## 223	+ 223	t	41	0	f	1.375
## 224	+ 224	t	54	0	f	0.085
## 225	+ 225	t	50	0	f	0.125
## 226	+ 226	t	43	0	f	0.250
## 227	+ 227	t	50	0	f	0.500
## 228	+ 228	f	41	0	f	2.460
## 229	+ 229	t	50	2	t	2.000
## 230	+ 230	t	58	0	f	0.665
## 231	+ 231	t	34	7	t	0.625
## 232	+ 232	t	29	2	t	13.875
## 233	+ 233	t	37	4	t	4.500
## 234	+ 234	t	25	0	f	5.750
## 235	+ 235	t	31	13	t	10.000
## 236	+ 236	t	33	5	t	2.085
## 237	+ 237	t	22	0	f	0.000
## 238	+ 238	t	26	1	t	1.415
## 239	+ 239	t	33	0	f	4.580
## 240	+ 240	t	36	6	t	2.500
## 241	+ 241	t	40	0	f	2.500
## 242	+ 242	t	32	3	t	1.750
## 243	+ 243	t	34	0	f	11.000
## 244	+ 244	t	27	5	t	2.710
## 245	+ 245	t	27	2	t	1.500
## 246	+ 246	t	33	1	t	2.040
## 247	+ 247	t	29	1	t	14.000
## 248	+ 248	t	35	11	t	0.290
## 249	+ 249	t	24	2	t	4.750
## 250	+ 250	t	20	6	t	0.290
## 251	+ 251	t	26	11	t	20.000
## 252	+ 252	t	31	6	t	5.000
## 253	+ 253	t	29	11	t	1.000
## 254	+ 254	t	25	1	t	0.460
## 255	- 255	f	22	0	f	0.250
## 256	- 256	f	33	0	f	1.085
## 257	- 257	f	25	0	f	2.000
## 258	- 258	f	28	0	f	0.500
## 259	- 259	f	33	0	f	0.040

## 260	- 260	f	34	0	f	0.165
## 261	- 261	f	27	0	f	5.750
## 262	- 262	f	31	0	f	0.000
## 263	- 263	f	35	0	f	0.335
## 264	- 264	f	24	0	f	0.000
## 265	- 265	f	38	0	f	0.000
## 266	- 266	f	26	0	f	0.040
## 267	- 267	f	38	0	f	0.000
## 268	- 268	f	30	0	f	1.250
## 269	+ 269	t	24	0	f	0.125
## 270	+ 270	f	24	0	f	0.210
## 271	+ 271	f	30	0	f	0.000
## 272	- 272	f	38	0	f	1.250
## 273	- 273	f	32	0	f	0.040
## 274	- 274	f	29	0	f	0.125
## 275	- 275	f	27	0	f	2.250
## 276	- 276	f	30	0	f	0.540
## 277	- 277	f	26	0	f	0.290
## 278	- 278	f	30	0	f	0.165
## 279	- 279	f	25	0	f	0.000
## 280	- 280	t	19	0	f	0.085
## 281	- 281	f	32	0	f	0.250
## 282	- 282	f	34	0	f	0.125
## 283	- 283	f	38	0	f	0.250
## 284	- 284	f	29	1	t	0.250
## 285	- 285	f	28	2	t	0.125
## 286	- 286	f	21	1	t	0.165
## 287	- 287	f	21	2	t	0.000
## 288	- 288	f	27	1	t	0.290
## 289	- 289	f	24	1	t	0.165
## 290	- 290	f	32	0	f	0.000
## 291	- 291	f	25	0	f	0.500
## 292	- 292	f	33	1	t	1.000
## 293	- 293	f	33	1	t	0.165
## 294	- 294	f	27	2	t	0.125
## 295	- 295	f	19	1	t	0.000
## 296	- 296	f	32	2	t	3.040
## 297	- 297	f	36	1	t	4.000
## 298	- 298	f	30	2	t	1.750
## 299	- 299	f	25	1	t	0.665
## 300	- 300	f	27	2	t	3.335
## 301	- 301	f	36	1	t	6.500
## 302	- 302	f	29	0	f	0.250
## 303	- 303	f	30	0	f	0.500
## 304	- 304	f	32	0	f	0.085
## 305	- 305	f	29	0	f	1.500
## 306	- 306	t	31	0	f	0.000
## 307	- 307	f	31	0	f	4.500
## 308	- 308	f	34	0	f	0.415
## 309	- 309	f	45	0	f	0.250
## 310	- 310	f	30	0	f	0.000
## 311	- 311	f	30	0	f	1.000

## 312	- 312	f	35	0	f	2.335
## 313	- 313	f	21	0	f	0.125
## 314	- 314	f	32	0	f	0.415
## 315	- 315	f	20	0	f	0.250
## 316	- 316	t	24	0	f	0.500
## 317	- 317	f	21	0	f	0.250
## 318	+ 318	f	28	0	f	0.000
## 319	+ 319	f	39	0	f	0.000
## 320	+ 320	f	27	0	f	1.500
## 321	+ 321	f	29	0	f	1.500
## 322	+ 322	f	34	0	f	10.000
## 323	+ 323	f	34	0	f	0.375
## 324	+ 324	t	34	11	t	0.250
## 325	- 325	f	28	0	f	1.165
## 326	- 326	f	36	0	f	1.000
## 327	- 327	f	31	0	f	0.040
## 328	- 328	f	30	0	f	0.500
## 329	- 329	f	34	0	f	3.000
## 330	- 330	f	24	0	f	0.085
## 331	- 331	f	28	0	f	0.000
## 332	- 332	f	28	0	f	2.500
## 333	- 333	f	23	0	f	1.000
## 334	- 334	f	27	0	f	1.000
## 335	- 335	f	21	0	f	0.500
## 336	- 336	f	27	0	f	0.165
## 337	- 337	f	35	0	f	1.000
## 338	- 338	f	29	0	f	0.500
## 339	- 339	f	29	0	f	2.000
## 340	- 340	f	31	0	f	0.750
## 341	- 341	f	32	0	f	3.000
## 342	- 342	f	18	0	f	0.040
## 343	- 343	f	32	0	f	0.500
## 344	- 344	f	30	0	f	0.000
## 345	- 345	f	23	0	f	0.500
## 346	- 346	f	30	0	f	0.000
## 347	- 347	f	39	0	f	0.250
## 348	- 348	f	32	0	f	2.500
## 349	- 349	t	27	3	t	0.585
## 350	- 350	f	27	1	t	2.250
## 351	- 351	f	33	0	f	0.000
## 352	- 352	f	42	0	f	0.000
## 353	- 353	f	25	0	f	1.500
## 354	- 354	f	32	0	f	0.585
## 355	- 355	f	27	0	f	0.250
## 356	- 356	f	26	2	t	1.000
## 357	- 357	f	26	0	f	0.165
## 358	- 358	f	35	0	f	0.040
## 359	- 359	f	29	0	f	0.165
## 360	- 360	f	24	0	f	0.000
## 361	- 361	f	25	0	f	5.500
## 362	- 362	f	27	0	f	0.085
## 363	- 363	f	28	0	f	0.000

## 364	- 364	f	31	0	f	0.290
## 365	- 365	f	25	2	t	0.165
## 366	- 366	f	31	1	t	13.875
## 367	- 367	f	30	0	f	0.165
## 368	- 368	f	27	0	f	0.165
## 369	- 369	f	24	0	f	3.000
## 370	- 370	f	32	0	f	0.750
## 371	- 371	f	23	0	f	7.000
## 372	- 372	f	31	0	f	0.000
## 373	- 373	f	39	0	f	1.000
## 374	- 374	f	32	0	f	0.125
## 375	- 375	f	28	0	f	0.040
## 376	- 376	f	29	0	f	1.000
## 377	- 377	f	28	0	f	0.125
## 378	- 378	f	29	0	f	2.000
## 379	- 379	f	35	0	f	0.125
## 380	- 380	f	34	0	f	4.000
## 381	- 381	f	17	0	f	2.250
## 382	- 382	f	32	0	f	0.165
## 383	- 383	f	27	0	f	4.500
## 384	- 384	f	25	0	f	5.000
## 385	- 385	f	30	0	f	1.585
## 386	- 386	f	26	0	f	1.500
## 387	- 387	f	27	0	f	0.540
## 388	- 388	f	33	0	f	0.500
## 389	- 389	f	21	0	f	0.000
## 390	- 390	f	36	0	f	0.085
## 391	- 391	f	28	0	f	1.000
## 392	- 392	f	36	0	f	0.210
## 393	- 393	f	30	0	f	0.250
## 394	- 394	f	28	0	f	1.000
## 395	- 395	f	31	0	f	0.250
## 396	- 396	f	26	0	f	0.540
## 397	- 397	f	33	0	f	0.040
## 398	- 398	f	33	0	f	0.125
## 399	- 399	f	25	0	f	1.250
## 400	- 400	f	34	0	f	0.085
## 401	- 401	f	34	0	f	0.290
## 402	- 402	f	34	0	f	0.290
## 403	- 403	f	33	0	f	3.085
## 404	- 404	f	23	0	f	0.750
## 405	- 405	f	27	0	f	1.085
## 406	- 406	f	30	0	f	0.000
## 407	- 407	f	31	2	t	0.165
## 408	- 408	f	45	1	t	1.000
## 409	- 409	f	33	1	t	0.085
## 410	- 410	f	23	4	t	0.335
## 411	- 411	f	34	5	t	0.000
## 412	- 412	f	31	1	t	1.250
## 413	- 413	f	29	0	f	0.085
## 414	- 414	f	30	0	f	0.000
## 415	- 415	f	28	0	f	0.125

## 416	- 416	f	29	0	f	3.250
## 417	- 417	f	26	0	f	0.125
## 418	- 418	f	33	0	f	0.540
## 419	- 419	f	35	2	t	0.375
## 420	- 420	f	36	0	f	0.000
## 421	- 421	f	28	0	f	1.000
## 422	- 422	f	39	0	f	1.500
## 423	- 423	f	31	0	f	1.750
## 424	- 424	f	24	0	f	1.165
## 425	- 425	f	26	0	f	1.500
## 426	- 426	f	30	0	f	0.250
## 427	- 427	f	34	0	f	0.250
## 428	- 428	f	39	0	f	0.040
## 429	- 429	f	26	0	f	0.290
## 430	- 430	f	30	0	f	0.085
## 431	- 431	f	34	0	f	1.500
## 432	- 432	f	34	0	f	0.165
## 433	- 433	f	31	0	f	0.085
## 434	- 434	f	31	0	f	0.500
## 435	- 435	f	33	0	f	2.415
## 436	- 436	f	33	4	t	0.000
## 437	- 437	f	36	3	t	0.000
## 438	- 438	f	26	0	f	0.000
## 439	- 439	f	24	1	t	0.000
## 440	- 440	f	33	2	t	0.375
## 441	- 441	f	32	11	t	1.000
## 442	- 442	f	31	2	t	0.000
## 443	- 443	f	32	0	f	0.125
## 444	- 444	f	26	0	f	0.040
## 445	- 445	f	29	0	f	0.000
## 446	- 446	f	29	0	f	0.000
## 447	- 447	f	33	0	f	0.165
## 448	- 448	f	26	0	f	0.000
## 449	- 449	f	27	1	t	0.000
## 450	- 450	f	32	0	f	0.500
## 451	- 451	f	39	0	f	7.000
## 452	- 452	f	29	0	f	1.500
## 453	- 453	f	27	0	f	3.500
## 454	- 454	f	32	0	f	0.250
## 455	- 455	f	29	0	f	3.750
## 456	- 456	f	27	0	f	0.085
## 457	- 457	f	34	0	f	0.000
## 458	- 458	f	27	0	f	0.040
## 459	- 459	f	36	0	f	5.000
## 460	- 460	f	28	0	f	1.500
## 461	- 461	f	27	0	f	0.000
## 462	- 462	f	48	4	t	0.085
## 463	- 463	f	44	0	f	0.125
## 464	- 464	f	54	10	t	0.000
## 465	- 465	f	30	1	t	0.000
## 466	- 466	f	44	1	t	2.790
## 467	- 467	f	38	2	t	2.500

## 468	- 468	f	41	3	t	0.040
## 469	- 469	f	38	0	f	0.750
## 470	- 470	f	43	0	f	0.415
## 471	- 471	f	42	0	f	0.085
## 472	- 472	f	46	0	f	0.040
## 473	- 473	f	34	0	f	0.125
## 474	- 474	f	51	0	f	1.000
## 475	- 475	f	37	0	f	0.125
## 476	- 476	f	48	0	f	0.750
## 477	- 477	f	43	0	f	0.085
## 478	- 478	f	40	0	f	10.000
## 479	- 479	f	44	0	f	0.415
## 480	- 480	f	40	0	f	0.085
## 481	- 481	f	36	6	t	0.165
## 482	- 482	f	37	1	t	0.415
## 483	- 483	f	34	10	t	1.750
## 484	- 484	f	40	2	t	0.040
## 485	- 485	f	33	0	f	1.165
## 486	- 486	f	41	2	t	0.040
## 487	- 487	f	49	0	f	0.085
## 488	- 488	f	35	0	f	0.040
## 489	- 489	f	38	0	f	0.000
## 490	- 490	f	32	0	f	0.125
## 491	+ 491	t	35	1	t	2.750
## 492	+ 492	t	38	2	t	4.625
## 493	+ 493	t	41	14	t	6.500
## 494	+ 494	t	42	0	f	6.000
## 495	+ 495	t	43	0	f	3.000
## 496	+ 496	t	27	0	f	1.500
## 497	+ 497	t	47	0	f	1.040
## 498	+ 498	t	37	3	t	1.665
## 499	+ 499	t	46	5	t	1.460
## 500	+ 500	t	44	3	t	1.625
## 501	+ 501	t	30	3	t	5.000
## 502	+ 502	t	36	10	t	3.500
## 503	+ 503	t	53	1	t	0.000
## 504	+ 504	t	43	2	t	4.750
## 505	+ 505	t	32	1	t	1.085
## 506	+ 506	t	34	16	t	7.000
## 507	+ 507	t	45	2	t	0.750
## 508	+ 508	t	32	19	t	1.835
## 509	+ 509	t	29	1	t	2.000
## 510	+ 510	t	40	1	t	2.250
## 511	+ 511	t	35	2	t	1.750
## 512	+ 512	t	42	0	f	0.000
## 513	+ 513	t	31	0	f	2.500
## 514	+ 514	t	34	0	f	0.000
## 515	+ 515	t	40	0	f	2.585
## 516	+ 516	t	24	0	f	6.500
## 517	+ 517	t	49	4	t	4.000
## 518	+ 518	t	53	5	t	1.750
## 519	+ 519	t	36	4	t	0.585

## 520	+ 520	t	32	5	t	0.125
## 521	+ 521	t	37	1	t	1.500
## 522	+ 522	t	47	5	t	2.250
## 523	+ 523	t	39	1	t	1.290
## 524	- 524	t	54	10	t	1.750
## 525	- 525	t	32	0	f	2.415
## 526	- 526	t	34	0	f	2.500
## 527	- 527	t	36	0	f	0.210
## 528	- 528	t	36	0	f	1.000
## 529	- 529	t	53	3	t	6.750
## 530	- 530	t	50	1	t	0.210
## 531	- 531	t	36	0	f	2.750
## 532	- 532	t	57	0	f	1.750
## 533	- 533	t	52	0	f	0.750
## 534	- 534	t	32	0	f	0.000
## 535	- 535	t	53	0	f	7.500
## 536	- 536	t	47	0	f	0.000
## 537	- 537	t	22	0	f	0.000
## 538	- 538	t	49	0	f	3.750
## 539	- 539	t	45	0	f	0.250
## 540	- 540	t	36	0	f	0.540
## 541	- 541	t	40	0	f	2.000
## 542	- 542	t	31	0	f	1.000
## 543	- 543	t	51	0	f	0.835
## 544	- 544	t	40	0	f	1.165
## 545	- 545	t	45	10	t	0.500
## 546	- 546	t	39	0	f	1.500
## 547	- 547	t	43	6	t	2.625
## 548	+ 548	t	33	6	t	1.875
## 549	+ 549	t	33	7	t	0.750
## 550	+ 550	t	49	0	f	16.000
## 551	+ 551	t	43	1	t	12.750
## 552	+ 552	t	56	11	t	0.000
## 553	+ 553	t	47	9	t	5.375
## 554	+ 554	t	42	14	t	4.000
## 555	+ 555	t	39	4	t	0.750
## 556	+ 556	t	43	6	t	0.210
## 557	+ 557	t	45	2	t	7.500
## 558	+ 558	t	40	16	t	1.085
## 559	+ 559	t	59	0	f	0.040
## 560	+ 560	t	29	7	t	2.290
## 561	+ 561	t	30	6	t	3.500
## 562	+ 562	t	41	0	f	1.250
## 563	+ 563	t	42	0	f	1.415
## 564	+ 564	t	44	0	f	1.585
## 565	+ 565	t	47	0	f	12.750
## 566	+ 566	t	22	0	f	0.040
## 567	+ 567	t	24	11	t	2.125
## 568	+ 568	t	47	0	f	0.875
## 569	+ 569	t	62	8	t	0.375
## 570	+ 570	t	49	4	t	0.750
## 571	+ 571	t	42	5	t	1.750

## 572	+ 572	t	39	8	t	1.085
## 573	+ 573	t	34	1	t	0.040
## 574	+ 574	t	44	11	t	0.000
## 575	+ 575	t	47	4	t	1.000
## 576	+ 576	t	34	1	t	3.250
## 577	+ 577	t	45	11	t	1.750
## 578	+ 578	t	44	3	t	1.000
## 579	+ 579	t	45	10	t	1.500
## 580	+ 580	t	43	5	t	1.290
## 581	+ 581	t	44	8	t	1.335
## 582	+ 582	f	37	1	t	0.040
## 583	+ 583	t	29	0	f	0.125
## 584	+ 584	t	42	0	f	5.250
## 585	+ 585	t	44	0	f	0.000
## 586	+ 586	t	26	0	f	0.000
## 587	+ 587	t	44	9	t	17.500
## 588	+ 588	t	53	9	t	8.500
## 589	+ 589	t	46	5	t	1.000
## 590	+ 590	t	34	7	t	0.290
## 591	+ 591	t	45	8	t	3.125
## 592	+ 592	t	25	3	t	4.250
## 593	+ 593	f	46	0	f	0.000
## 594	+ 594	f	38	0	f	0.085
## 595	+ 595	t	37	0	f	0.085
## 596	+ 596	t	45	0	f	0.250
## 597	+ 597	t	46	8	t	2.375
## 598	+ 598	t	51	3	t	2.500
## 599	+ 599	f	36	1	t	1.000
## 600	+ 600	t	40	11	t	2.000
## 601	+ 601	t	42	4	t	0.540
## 602	- 602	f	42	0	f	0.000
## 603	- 603	f	37	0	f	0.250
## 604	- 604	f	38	0	f	0.125
## 605	- 605	t	34	0	f	0.085
## 606	- 606	f	32	0	f	1.250
## 607	+ 607	f	36	0	f	0.040
## 608	- 608	f	39	0	f	0.500
## 609	- 609	f	44	0	f	4.250
## 610	- 610	f	44	0	f	0.085
## 611	- 611	f	32	0	f	0.125
## 612	- 612	f	37	2	t	5.085
## 613	- 613	f	45	1	t	0.290
## 614	- 614	f	42	2	t	0.585
## 615	- 615	f	57	0	f	0.125
## 616	- 616	f	33	2	t	0.250
## 617	- 617	f	42	1	t	1.585
## 618	- 618	f	32	2	t	0.000
## 619	- 619	f	52	1	t	2.000
## 620	- 620	t	34	0	f	0.125
## 621	- 621	f	47	0	f	0.125
## 622	+ 622	f	42	0	f	2.250
## 623	+ 623	f	45	0	f	0.000

## 624	- 624	f	39	0	f	0.665
## 625	- 625	f	43	0	f	0.665
## 626	- 626	f	49	0	f	2.085
## 627	- 627	f	34	0	f	0.165
## 628	- 628	f	39	0	f	0.000
## 629	- 629	f	40	0	f	0.500
## 630	- 630	f	45	0	f	1.665
## 631	- 631	f	42	0	f	0.250
## 632	- 632	f	39	1	t	0.125
## 633	- 633	f	37	0	f	0.000
## 634	- 634	f	26	0	f	0.000
## 635	- 635	f	26	1	t	0.250
## 636	- 636	f	40	2	t	0.960
## 637	- 637	f	49	0	f	0.500
## 638	- 638	f	30	0	f	0.790
## 639	- 639	f	34	0	f	0.250
## 640	- 640	f	43	0	f	1.500
## 641	- 641	f	40	0	f	2.500
## 642	- 642	f	33	0	f	3.500
## 643	- 643	f	41	0	f	3.500
## 644	- 644	f	44	0	f	3.000
## 645	- 645	f	28	0	f	0.290
## 646	- 646	f	37	0	f	0.165
## 647	- 647	f	38	0	f	0.165
## 648	- 648	f	30	0	f	0.250
## 649	- 649	f	37	0	f	3.500
## 650	- 650	f	33	6	t	0.000
## 651	- 651	f	48	0	f	1.000
## 652	- 652	f	43	1	t	0.125
## 653	- 653	f	36	0	f	0.335
## 654	- 654	t	31	0	f	0.500
## 655	- 655	f	33	1	t	0.415
## 656	- 656	f	28	0	f	0.000
## 657	- 657	f	49	1	t	2.290
## 658	- 658	f	45	0	f	0.250
## 659	- 659	f	41	0	f	1.000
## 660	- 660	f	35	1	t	0.250
## 661	- 661	f	49	0	f	0.085
## 662	- 662	f	39	0	f	0.165
## 663	- 663	f	36	0	f	0.875
## 664	- 664	f	36	0	f	1.500
## 665	- 665	f	38	0	f	0.040
## 666	- 666	f	38	0	f	0.040
## 667	- 667	f	29	0	f	0.250
## 668	- 668	f	40	1	t	1.750
## 669	- 669	f	33	0	f	0.085
## 670	- 670	f	43	0	f	1.500
## 671	- 671	f	31	0	f	5.500
## 672	- 672	f	47	0	f	0.500
## 673	- 673	f	27	0	f	0.500
## 674	- 674	f	46	0	f	2.000
## 675	- 675	f	34	0	f	0.210

```

## 676      - 676      f   40     0      f  0.665
## 677      - 677      f   43     12     t  0.085
## 678      - 678      f   36     1      t  0.040
## 679      - 679      f   35     0      f  0.000
## 680      - 680      f   35     0      f  0.000
## 681      - 681      f   39     0      f  0.290
## 682      - 682      f   48     0      f  3.000
## 683      - 683      f   38     0      f  0.335
## 684      - 684      f   41     0      f  0.585
## 685      - 685      f   25     0      f  3.500
## 686      - 686      f   36     0      f  1.250
## 687      - 687      f   32     2      t  2.000
## 688      - 688      f   38     1      t  2.000
## 689      - 689      f   35     0      f  0.040
## 690      - 690      f   45     0      f  8.290

```

```

# Build a new decision tree model with the top variables
tree_model_top <- rpart(approval ~ ., data = train_data_top, method = "class", control = rpart.control(minsplit = 10, maxdepth = 20))

# Make predictions on the test data using the new model
predictions_top <- predict(tree_model_top, test_data_top, type = "class")

# Evaluate the accuracy of the new model
accuracy_top <- confusionMatrix(predictions_top, test_data_top$approval)$overall["Accuracy"]

# Print the accuracy of the original and new models
print(paste("Original Model Accuracy:", round(accuracy_top, 2)))

```

```
## [1] "Original Model Accuracy: 0.96"
```

```
print(paste("Model with Top 6 Variables Accuracy:", round(accuracy_top, 2)))
```

```
## [1] "Model with Top 6 Variables Accuracy: 0.96"
```

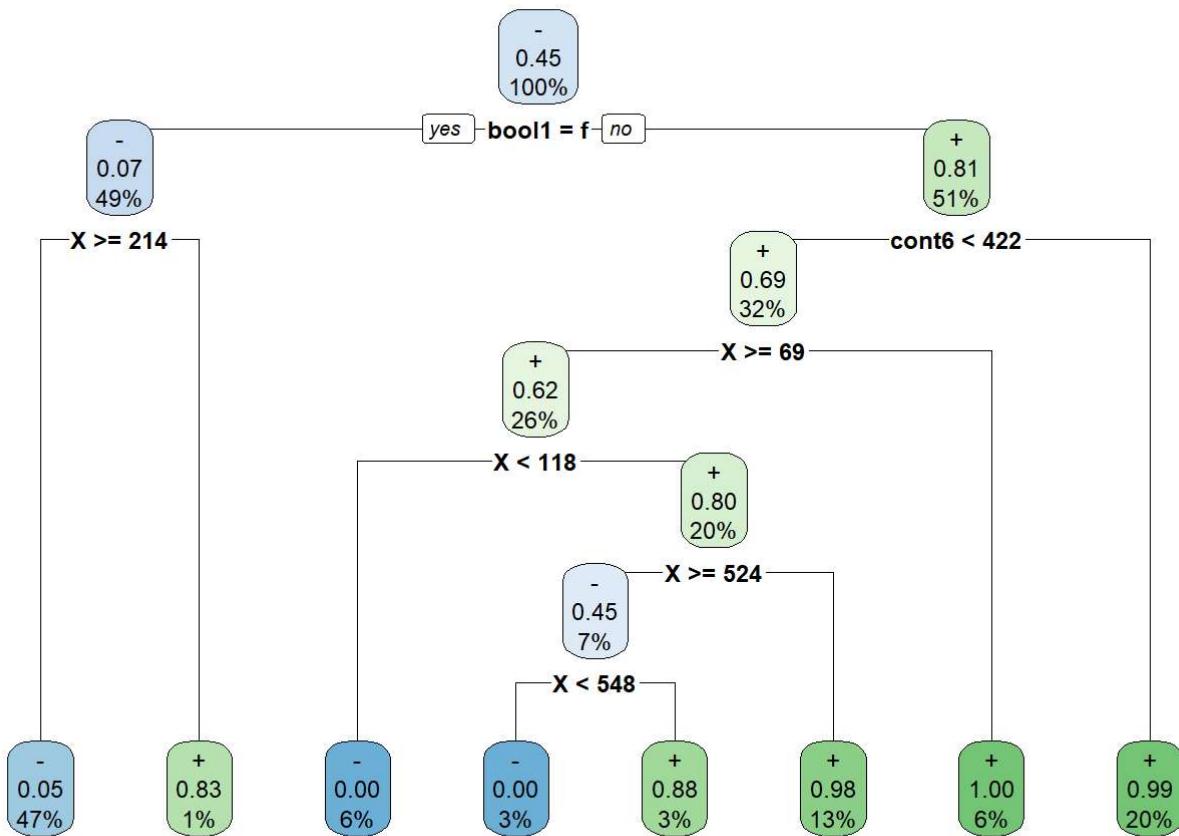
```
#problem 4(E)
```

```
install.packages("rpart.plot")
```

```
## Warning: package 'rpart.plot' is in use and will not be installed
```

```
library(rpart.plot)
```

```
# Create a visualization of the original tree
rpart.plot(tree_model, box.palette = "auto")
```



```
# Create a visualization of the tree with reduced variables (Model d)
rpart.plot(tree_model_top, box.palette = "auto")
```

