STT 811

In-Class Assignment 13

This problem will use the Heart dataset, with AHD as the target.

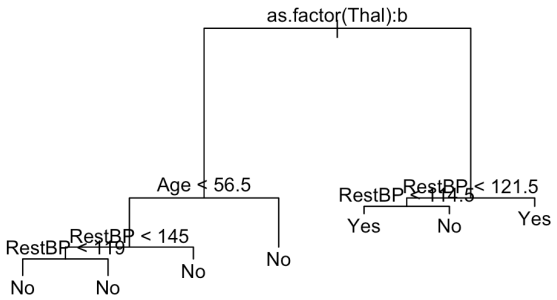
1. Split the data into training and test datasets (with a 75/25 split).

```
split_pct <- 0.75
n <- length(heart$AHD)*split_pct # train size
row_samp <- sample(1:length(heart$AHD), n, replace = FALSE)
train <- heart[row_samp,]
test <- heart[-row_samp,]
```

2. Build a decision tree model based on Thal, RestBP, and Age.

```
Heart_tree <- tree(as.factor(AHD) ~ RestBP + Age + as.factor(Thal), data = train)
```

3. Plot the tree.

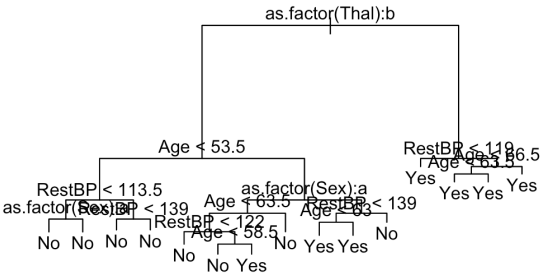


4. Create the confusion matrix and give the accuracy.

```
confusionMatrix(tree_pred, as.factor(test$AHD))
```

```
Confusion Matrix and Statistics

          Reference
Prediction No Yes
       No  24  18
       Yes 12  22

               Accuracy : 0.6053
                 95% CI : (0.4865, 0.7156)
    No Information Rate : 0.5263
    P-Value [Acc > NIR] : 0.1028

                  Kappa : 0.2149

 Mcnemar's Test P-Value : 0.3613

            Sensitivity : 0.6667
            Specificity : 0.5500
         Pos Pred Value : 0.5714
         Neg Pred Value : 0.6471
             Prevalence : 0.4737
         Detection Rate : 0.3158
   Detection Prevalence : 0.5526
      Balanced Accuracy : 0.6083

       'Positive' Class : No
```

5. Try some other combinations of inputs. See if the new inputs appear in the tree. If so, calculate their confusion matrix.




```
Confusion Matrix and Statistics

          Reference
Prediction No Yes
       No  28   9
       Yes 13  26

               Accuracy : 0.7105
                 95% CI : (0.5951, 0.8089)
    No Information Rate : 0.5395
    P-Value [Acc > NIR] : 0.001725

                  Kappa : 0.4223

 Mcnemar's Test P-Value : 0.522431

            Sensitivity : 0.6829
            Specificity : 0.7429
         Pos Pred Value : 0.7568
         Neg Pred Value : 0.6667
             Prevalence : 0.5395
         Detection Rate : 0.3684
   Detection Prevalence : 0.4868
      Balanced Accuracy : 0.7129

       'Positive' Class : No
```