Quarta lista de exercícios

```r
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# Exercicio 1

#a
matiz <- rbind(c(0, 9, 3, 6, 11), c(9, 0, 7, 5, 10), c(3, 7, 0, 9, 2), c(6, 5, 9,
0, 8), c(11, 10, 2, 8, 0))
matiz <- as.dist(matiz)
cluster <- hclust(matiz, method = "complete")
plot(cluster)

#b
matiz <- rbind(c(0, 9, 3, 6, 11), c(9, 0, 7, 5, 10), c(3, 7, 0, 9, 2), c(6, 5, 9,
0, 8), c(11, 10, 2, 8, 0))
matiz <- as.dist(matiz)
cluster <- hclust(matiz, method = "single")
plot(cluster)

#c
matiz <- rbind(c(0, 9, 3, 6, 11), c(9, 0, 7, 5, 10), c(3, 7, 0, 9, 2), c(6, 5, 9,
0, 8), c(11, 10, 2, 8, 0))
matiz <- as.dist(matiz)
cluster <- hclust(matiz, method = "complete")
plot(cluster)
rect.hclust(cluster, k = 2)

#d
matiz <- rbind(c(0, 9, 3, 6, 11), c(9, 0, 7, 5, 10), c(3, 7, 0, 9, 2), c(6, 5, 9,
0, 8), c(11, 10, 2, 8, 0))
matiz <- as.dist(matiz)
cluster <- hclust(matiz, method = "single")
plot(cluster)
rect.hclust(cluster, k = 2)


# Exercício 2
#a
```

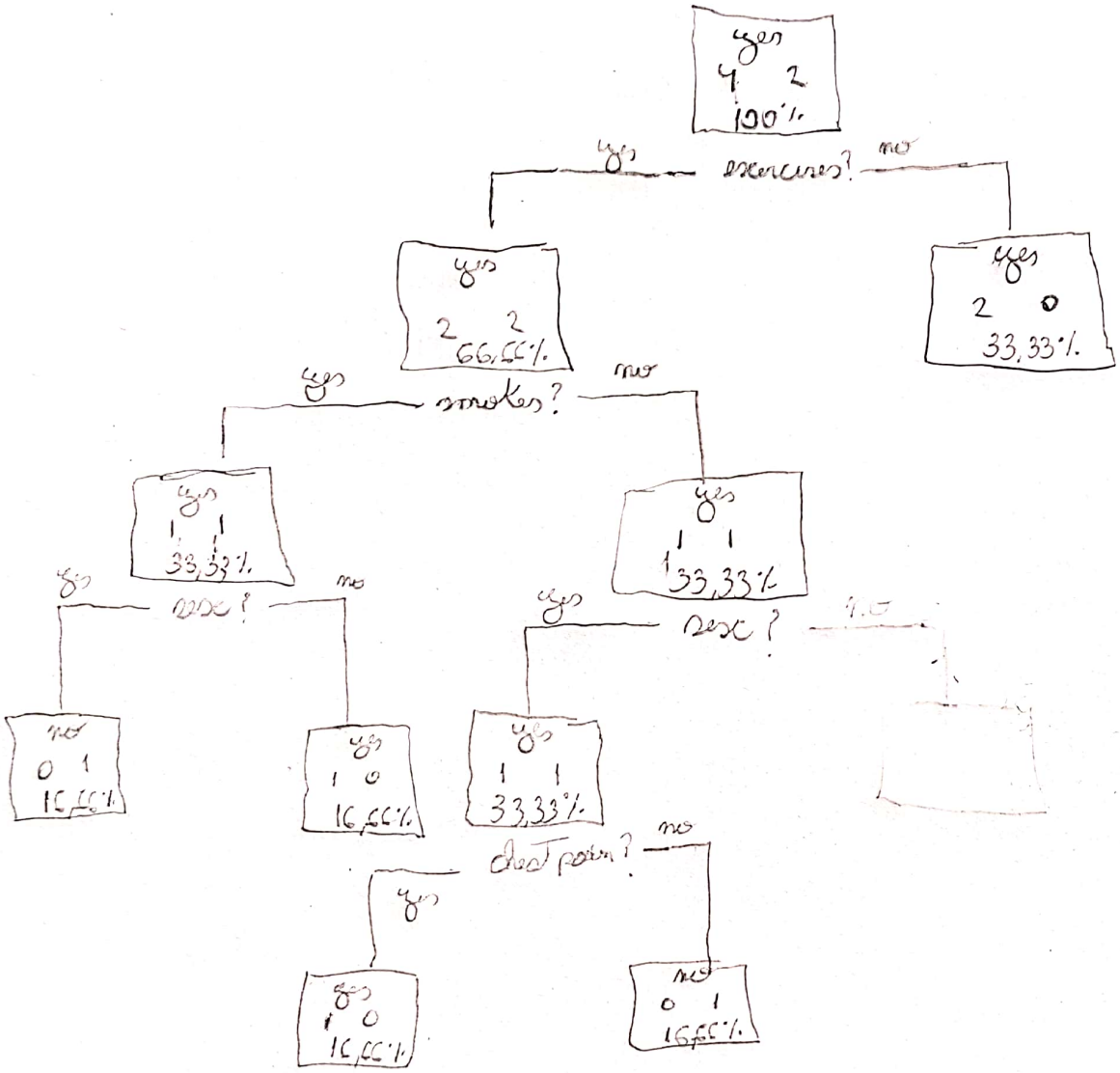

```
#install.packages("rpart.plot")
library(tree)
library(rpart)
library(rpart.plot)
##b

patients <-read.delim("C:\\Users\\victo\\Downloads\\heart.txt", header = TRUE, sep
= ",");
patients <-patients[, -1]
patients <- patients[sample(nrow(patients)), ]
patients$sex <- as.factor(patients$sex)
patients$chest_pain <- as.factor(patients$chest_pain)
patients$smokes <- as.factor(patients$smokes)
patients$exercises <- as.factor(patients$exercises)
patients$heart_attack <- as.factor(patients$heart_attack)

treino <- patients[1:5, ]
```

```r
teste <- patients[6:6, ]
modelo.hearth_attack <- rpart(heart_attack ~., data = treino, parms = list(split =
"gini"))
rpart.plot(modelo.hearth_attack, extra = 101)


hasHeartAttack = function (chest_pain, sex, smokes, exercises) {
  retunstr <- NULL
  if(exercises == "no") {
    return ("yes")
  }else{
    if(smokes == "no"){
      retunstr <- "yes"
      if(sex == "yes"){
        retunstr <- "yes"
        if(chest_pain == "yes"){
          retunstr <- "yes"
        }else{
          retunstr <- "no"
        }
      }
    }else{
      retunstr <- "yes"
      if(sex == "yes"){
        retunstr <- "no"
      }else{
        retunstr <- "yes"
      }
    }
  }
  return(retunstr)
  }

print(hasHeartAttack("yes","yes","yes","yes"))


# Exercício 3
data <- read.csv("C:\\Users\\victo\\Downloads\\SBI.csv", header = TRUE, sep = ",")
data
str(data)

#a
dataValues <- data$sbi == "NotApplicable"
for(i in 1:length(dataValues)) {
  if(dataValues[i]) {
    dataValues[i] <- "no"
  } else {
    dataValues[i] <- "yes"
  }
}
data$infection <- as.factor(dataValues)

#b
data <- data[, c(-1, -2, -8)]
```

```r
#c
reordered <- data[sample(nrow(data)), ]
nrow(data)*0.8
train <- reordered[1:1878, ]
test <- reordered[1879:nrow(data), ]
train

#d
library(tree)
library(rpart)
library(rpart.plot)

model.Heart <- rpart(infection ~., data = train, parms = list(split = "gini"))
rpart.plot(model.Heart, extra = 101)

predictHeart <- predict(model.Heart, newdata = test, type = "class")
mean(predictHeart == test$infection)
table(test$infection, predictHeart)

#e
#install.packages("randomForest")
library(randomForest)
rf.model.Heart <- randomForest(infection~., data = train)
rf.model.Heart
rf.predictHeart <- predict(rf.model.Heart, newdata = test)

mean(test$infection == rf.predictHeart)
table(test$infection, rf.predictHeart)
```