4.Let us consider one example to make the calculation method clear. Assume that the minimum and maximum values for the feature F are $50,000 and $100,000 correspondingly. It needs to range *F* from 0 to 1. In accordance with min-max normalization, *v*= $80,

b) Use the two methods below to normalize the following group of data: 200, 300, 400, 600, 1000

 (a) min-max normalization by setting min = 0 and max = 1

 (b) z-score normalization

PROGRAM:

data <- c(200, 300, 400, 600, 1000)

min\_max\_normalization <- function(x) {

return((x - min(x)) / (max(x) - min(x)))

}

min\_max\_normalized\_data <- min\_max\_normalization(data)

z\_score\_normalization <- function(x) {

return((x - mean(x)) / sd(x))

}

z\_score\_normalized\_data <- z\_score\_normalization(data)

cat("Min-Max Normalized Data:", min\_max\_normalized\_data, "\n")

cat("Z-Score Normalized Data:", z\_score\_normalized\_data, "\n")

class\_A <- c(76, 35, 47, 64, 95, 66, 89, 36, 84)

class\_B <- c(51, 56, 84, 60, 59, 70, 63, 66, 50)

mean\_A <- mean(class\_A)

median\_A <- median(class\_A)

range\_A <- range(class\_A)

range\_diff\_A <- diff(range\_A)

mean\_B <- mean(class\_B)

median\_B <- median(class\_B)

range\_B <- range(class\_B)

range\_diff\_B <- diff(range\_B)

cat("Class A - Mean:", mean\_A, "Median:", median\_A, "Range:", range\_A, "Range Difference:", range\_diff\_A, "\n")

cat("Class B - Mean:", mean\_B, "Median:", median\_B, "Range:", range\_B, "Range Difference:", range\_diff\_B, "\n")

boxplot(class\_A, class\_B, names = c("Class A", "Class B"), col = c("lightblue", "lightgreen"),

main = "Boxplot of Class A and Class B Scores",

ylab = "Scores")

OUTPUT:

