Test 10: t-test for Two Population Means (Method of Paired Comparisons)

# Load Required Packages:  
library(package = dplyr)  
library(package = psych)  
  
# Load Required Data:  
data = read.csv(file = "data/Data\_Test\_10.csv", header = TRUE)  
  
# Show Data:  
headTail(x = data, top = 2, bottom = 2)

## Control Treatment  
## 1 7.41 7.56  
## 2 7.81 7.27  
## ... ... ...  
## 9 7.79 8.42  
## 10 7.19 7.31

# Assumption Checking:  
# 1. The test is accurate if the populations are normally distributed.  
shapiro.test(x = data$Control)

##   
## Shapiro-Wilk normality test  
##   
## data: data$Control  
## W = 0.88975, p-value = 0.1685

shapiro.test(x = data$Treatment)

##   
## Shapiro-Wilk normality test  
##   
## data: data$Treatment  
## W = 0.93895, p-value = 0.5414

# use t.test function - alternative = "two.sided":  
t.test(x = data$Control, y = data$Treatment,  
 alternative = "two.sided", conf.level = 0.95, paired = TRUE)

##   
## Paired t-test  
##   
## data: data$Control and data$Treatment  
## t = 1.2317, df = 9, p-value = 0.2493  
## alternative hypothesis: true difference in means is not equal to 0  
## 95 percent confidence interval:  
## -0.1556149 0.5276149  
## sample estimates:  
## mean of the differences   
## 0.186