Lab 05

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library(readxl)  
Breast\_Cancer <- read\_excel("C:/Users/PRASANTA/Downloads/Breast\_Cancer.xls")  
View(Breast\_Cancer)

colnames(Breast\_Cancer)

## [1] "Age" "Race" "Marital Status"   
## [4] "T Stage" "N Stage" "6th Stage"   
## [7] "differentiate" "Grade" "A Stage"   
## [10] "Tumor Size" "Estrogen Status" "Progesterone Status"   
## [13] "Regional Node Examined" "Reginol Node Positive" "Survival Months"   
## [16] "Status"

head(Breast\_Cancer)

## # A tibble: 6 × 16  
## Age Race Marital St…¹ T Sta…² N Sta…³ 6th S…⁴ diffe…⁵ Grade A Sta…⁶ Tumor…⁷  
## <dbl> <chr> <chr> <chr> <chr> <chr> <chr> <chr> <chr> <dbl>  
## 1 68 White Married T1 N1 IIA Poorly… 3 Region… 4  
## 2 50 White Married T2 N2 IIIA Modera… 2 Region… 35  
## 3 58 White Divorced T3 N3 IIIC Modera… 2 Region… 63  
## 4 58 White Married T1 N1 IIA Poorly… 3 Region… 18  
## 5 47 White Married T2 N1 IIB Poorly… 3 Region… 41  
## 6 51 White Single T1 N1 IIA Modera… 2 Region… 20  
## # … with 6 more variables: `Estrogen Status` <chr>,  
## # `Progesterone Status` <chr>, `Regional Node Examined` <dbl>,  
## # `Reginol Node Positive` <dbl>, `Survival Months` <dbl>, Status <chr>, and  
## # abbreviated variable names ¹​`Marital Status`, ²​`T Stage`, ³​`N Stage`,  
## # ⁴​`6th Stage`, ⁵​differentiate, ⁶​`A Stage`, ⁷​`Tumor Size`

library('EnvStats')

##   
## Attaching package: 'EnvStats'

## The following objects are masked from 'package:stats':  
##   
## predict, predict.lm

## The following object is masked from 'package:base':  
##   
## print.default

x<-Breast\_Cancer$`Tumor Size`  
x

## [1] 4 35 63 18 41 20 8 30 103 32 13 59 35 15 35 19 46 24  
## [19] 25 29 30 40 29 70 20 22 50 17 25 21 40 15 15 20 30 10  
## [37] 27 18 35 23 70 17 21 23 5 51 9 15 32 5 23 55 120 77  
## [55] 2 11 25 18 15 12 18 17 26 75 13 15 70 15 15 17 130 34  
## [73] 30 10 22 55 25 50 50 15 30 20 22 15 15 40 120 80 17 3  
## [91] 60 14 26 25 12 25 30 25 24 27 70 16 45 27 23 25 40 20  
## [109] 21 36 14 51 50 45 51 19 76 20 35 27 35 35 50 38 15 17  
## [127] 25 19 15 18 11 45 12 20 45 18 25 21 49 70 7 19 17 38  
## [145] 34 30 4 72 18 25 9 21 20 15 18 100 17 7 24 43 30 7  
## [163] 18 12 25 62 20 70 37 13 40 70 12 9 10 55 18 15 25 50  
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## [235] 17 14 60 55 120 11 39 23 28 37 40 9 8 28 15 17 50 48  
## [253] 30 68 110 23 12 13 40 30 9 22 30 12 10 25 16 65 22 17  
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## [379] 30 90 27 47 30 25 17 22 18 18 25 27 25 70 65 22 45 20  
## [397] 65 17 15 15 19 90 10 40 31 30 26 25 11 22 59 23 25 18  
## [415] 15 30 25 27 25 24 24 20 10 7 42 54 75 15 22 20 65 61  
## [433] 27 16 35 55 17 8 25 10 26 120 7 18 30 70 20 80 30 45  
## [451] 25 6 21 11 18 40 20 12 16 10 20 20 25 17 22 20 20 30  
## [469] 13 15 36 8 10 35 70 35 74 16 70 21 100 70 12 80 25 19  
## [487] 25 16 60 15 20 9 16 60 15 12 17 25 18 15 45 70 10 9  
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## [559] 16 25 30 19 30 55 80 50 14 10 30 60 24 32 42 35 26 30  
## [577] 31 11 26 18 43 20 35 13 14 81 10 10 20 30 22 20 28 80  
## [595] 37 35 12 19 20 22 14 32 80 21 25 21 15 28 18 27 30 25  
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## [631] 80 20 27 20 30 25 22 63 10 10 40 10 40 20 30 6 22 22  
## [649] 15 40 45 13 25 11 58 30 23 9 32 35 15 15 21 51 15 60  
## [667] 20 51 25 30 11 40 5 35 38 30 25 25 27 25 18 40 40 15  
## [685] 20 23 34 16 18 50 45 100 18 23 25 32 30 30 30 18 24 70  
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## [847] 50 8 40 16 18 13 35 12 50 29 20 7 21 20 22 31 45 25  
## [865] 35 15 22 15 16 26 35 30 23 18 123 16 11 75 60 20 15 27  
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## [1009] 60 17 55 17 29 40 17 30 32 40 15 35 32 21 25 33 22 15  
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## [1045] 45 11 17 17 40 5 13 19 19 35 16 15 23 15 19 18 16 21  
## [1063] 32 13 16 40 50 35 16 35 36 35 55 25 22 17 55 10 23 25  
## [1081] 5 16 55 24 21 13 22 14 30 18 16 56 31 14 15 82 16 16  
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## [1117] 37 25 40 50 15 25 80 13 25 40 15 19 65 18 15 16 23 21  
## [1135] 10 20 40 31 15 11 55 15 37 42 22 48 15 7 40 12 12 65  
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## [1171] 31 11 19 35 9 21 6 20 60 38 9 11 30 22 25 13 30 25  
## [1189] 25 48 6 14 7 90 25 15 120 14 15 35 30 16 9 23 17 43  
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## [3475] 2 22 59 25 14 43 8 70 28 18 12 20 20 11 17 17 26 12  
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## [3997] 19 19 18 30 45 45 15 19 24 40 35 21 18 100 23 25 80 15  
## [4015] 68 40 50 28 10 9 46 22 44 30

var(x)

## [1] 446.0416

H0:var\_Tumor size=450 H1:var\_Tumor Size!=450

varTest(x,alternative = "two.sided",sigma.squared = 450,conf.level = 0.95)

## $statistic  
## Chi-Squared   
## 3987.612   
##   
## $parameters  
## df   
## 4023   
##   
## $p.value  
## [1] 0.6978332  
##   
## $estimate  
## variance   
## 446.0416   
##   
## $null.value  
## variance   
## 450   
##   
## $alternative  
## [1] "two.sided"  
##   
## $method  
## [1] "Chi-Squared Test on Variance"  
##   
## $data.name  
## [1] "x"  
##   
## $conf.int  
## LCL UCL   
## 427.1735 466.1942   
## attr(,"conf.level")  
## [1] 0.95  
##   
## attr(,"class")  
## [1] "htestEnvStats"

Conclusion:Here P value is 0.6978332 which is greater than alpha=0.05,so here we accept the null hypothesis.

White<-subset(Breast\_Cancer,Race=='White')

Black<-subset(Breast\_Cancer,Race=='Black')

y<-Breast\_Cancer$Race  
y

## [1] "White" "White" "White" "White" "White" "White" "White" "White" "White"  
## [10] "White" "White" "White" "White" "White" "White" "White" "White" "White"  
## [19] "Black" "White" "Other" "White" "White" "White" "White" "White" "White"  
## [28] "White" "White" "White" "White" "White" "White" "White" "Other" "White"  
## [37] "White" "White" "White" "Other" "White" "White" "Other" "Black" "White"  
## [46] "White" "White" "White" "White" "White" "White" "White" "Black" "White"  
## [55] "White" "White" "White" "White" "White" "White" "Other" "White" "White"  
## [64] "White" "White" "White" "White" "White" "Other" "White" "White" "White"  
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## [82] "White" "White" "White" "White" "White" "White" "White" "White" "White"  
## [91] "White" "White" "Other" "Other" "White" "White" "White" "White" "White"  
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## [136] "White" "White" "White" "White" "White" "White" "White" "White" "White"  
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## [4024] "White"

var(White$`Tumor Size`)

## [1] 447.1265

var(Black$`Tumor Size`)

## [1] 491.3952

v1=tumor size of White(race) v2=tumor size of Black(race)

H0:v1=v2 H1:v1!=v2

var.test(White$`Tumor Size`,Black$`Tumor Size`,alternative = 'two.sided',conf.level = 0.95)

##   
## F test to compare two variances  
##   
## data: White$`Tumor Size` and Black$`Tumor Size`  
## F = 0.90991, num df = 3412, denom df = 290, p-value = 0.2585  
## alternative hypothesis: true ratio of variances is not equal to 1  
## 95 percent confidence interval:  
## 0.7630909 1.0717090  
## sample estimates:  
## ratio of variances   
## 0.9099123

Conclusion: Here p value is less than alpha.so we reject the null hypothesis.Therefore tumor size of White(race) is not equal to tumor size of Black(race).