HW 10

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my.two.samples.t.test <- function(x, y, mu = 0, alternative, threshold = 0.05) {  
 nx <- length(x)  
 ny <- length(y)  
 mx<- mean(x)  
 my <- mean(y)  
 df <- nx + ny - 2  
 sp <- sqrt(((nx - 1)\*var(x) + ((ny - 1)\*var(y))/df))  
 t.stat <- (mx - my - mu)/(sp\*((1/nx) + (1/ny)))  
  
 if(alternative == 'two.sided'){  
 p.res = 2 \* min(pt(t.stat, df = df), (1 - pt(t.stat, df = df)))  
 }  
 if(alternative == 'less'){  
 p.res = pt(t.stat, df = df)  
 }  
 if(alternative == 'greater'){  
 p.res = 1 - pt(t.stat, df = df)  
 }  
   
 if(p.res < threshold) {  
 con <- 'Reject H0'  
 } else { con <- 'Accept H0'}  
   
 result <- list(test = "Student's t-test", statistics = t.stat,   
 p.value = p.res, conclusion = con)  
 return(result)  
 }

set.seed(123)  
my.two.samples.t.test(rnorm(100, 0, 1), rnorm(100, 1, 2), mu = 0, alternative = 'less', threshold = 0.05)

## $test  
## [1] "Student's t-test"  
##   
## $statistics  
## [1] -3.780714  
##   
## $p.value  
## [1] 0.0001034802  
##   
## $conclusion  
## [1] "Reject H0"

set.seed(123)  
my.two.samples.t.test(rnorm(100, 5, 10), rnorm(100, 4.5, 10), mu = 0, alternative = 'two.sided', threshold = 0.05)

## $test  
## [1] "Student's t-test"  
##   
## $statistics  
## [1] 1.361165  
##   
## $p.value  
## [1] 0.1750086  
##   
## $conclusion  
## [1] "Accept H0"