

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"
```