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R 4
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R assignment 4

Brass Player	Control Group
4.7	4.2
4.6	4.7
4.3	5.1
4.5	4.7
5.5	5.0
4.9	-
5.3	-

1. Put the data into a "long format" data frame. That is one column for vital measure and second character or factor column with the label of "Brass" or "Control".
2. Conduct a test using "t.test" to determine whether the population mean for brass is larger than that for control.

```
> Brass <- c(4.7,
+            4.6,
+            4.3,
+            4.5,
+            5.5,
+            4.9,
+            5.3)
> Control <- c(4.2,
+              4.7,
+              5.1,
+              4.7,
+              5.0)
>
> t.test(Brass)

     One Sample t-test

data:  Brass
t = 29.382, df = 6, p-value = 1.03e-07
alternative hypothesis: true mean is not equal to 0
95 percent confidence interval:
 4.426452 5.230691
sample estimates:
mean of x
 4.828571
```

```
> t.test(Control)

     One Sample t-test

data:  Control
t = 30.221, df = 4, p-value = 7.141e-06
alternative hypothesis: true mean is not equal to 0
95 percent confidence interval:
 4.304532 5.175468
sample estimates:
mean of x
     4.74
```

So, mean of brass > control

3. Provide the equivalent 95% confidence interval for the difference of two population means means.

```
> sb <- sd(Brass)
> sc <- sd(Control)
>
> ab <- mean(Brass)
> ac <- mean(Control)
>
> nb <- 7
> nc <- 5
>
> error_b <- qt(0.975, df=n-1) * s/sqrt(nb)
> error_c <- qt(0.975, df=n-1) * s/sqrt(nc)
>
> left <- ab - error_b
> right <- ab + error_b
> print("Brass")
[1] "Brass"
> left
[1] -0.7273011
> right
[1] 10.38444
>
> left <- ac - error_c
> right <- ac + error_c
> print("Control")
[1] "Control"
> left
[1] -1.833797
> right
[1] 11.3138
```

The CI for Brass is (-0.73, 10.38) and for Control is (-1.83, 11.31)

4. A researcher claims that in theory the "spread/variance" in the two populations is the same. Repeat step 2 utilizing this assumption with the argument "var.equal"

```
t.test(Brass, Control, alternative = "two.sided", mu = 0, var.equal = TRUE
)

     Two Sample t-test

data:  Brass and Control
```

```
t = 0.37509, df = 10, p-value = 0.7154
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -0.4375637  0.6147065
sample estimates:
mean of x mean of y
 4.828571  4.740000
```