MATH-650 Assignment 2

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```
ex0112<-read.csv('ex0112.csv')
fishoil.diet <- ex0112[ex0112$Diet=='FishOil',]
regularoil.diet <- ex0112[ex0112$Diet=='RegularOil',]
```

Part(a)

```
n1 <- nrow(fishoil.diet)
n2 <- nrow(regularoil.diet)
mu1 <- mean(fishoil.diet$BP)
mu2 <- mean(regularoil.diet$BP)
s1 <- sd(fishoil.diet$BP)
s2 <- sd(regularoil.diet$BP)
```

Average of group with diet 'FishOil': $\mu_f = 6.5714286$

Standard deviation of group with diet 'FishOil': $\sigma_f = 5.8554004$

Average of group with diet 'RegularOil': μ_r = -1.1428571

Standard deviation of group with diet 'RegularOil': $\sigma_r = 3.1847853$

Part(b)

```
sp <- sqrt( ( (n1-1)*s1^2 + (n2-1)*s2^2 ) / (n1+n2-2) )
```

Pooled standard deviation $= s_P = \sqrt{\frac{(n_1-1)s_1^2+(n_2-1)s_2^2}{(n_1+n_2-2)}}$

$s_P = 4.7132033$

Part (c)

```
se <- sp*sqrt(1/n1+1/n2)
```

Standard error $SE(\bar{Y_2} - \bar{Y_1}) = 2.5193132$

Part (d)

```
df <- n1+n2-2
qt975 <- qt(c(.975), df=df)
```

Degrees of freedom $= n_1 + n_2 - 2 = 12$

97.5^{th} percentile of $t - distribution$ $(df = 12)$: 2.1788128

Part (e)

```
alpha <- 0.05
t <- qt(1-alpha/2,df)
CI_l <- (mu2-mu1)-t*se
CI_h <- (mu2-mu1)+t*se
```

95% CI for $\mu_2 - \mu_1$: [-13.2033975,-2.2251739] t = 2.1788128

Part (f)

```
T <- (mu2-mu1)/se
p <-  pt(T, df=df)
```

The t-statistic is given by: t = -3.0620591 with df = 12

Part (g)

The appropriate one sided p-value is(since $t < 0$): 0.9975347

Problem (14)

```
ttest <- t.test( regularoil.diet$BP, fishoil.diet$BP, alternative="greater", var.equal=F)
ttest
```

```
##
##  Welch Two Sample t-test
##
## data:  regularoil.diet$BP and fishoil.diet$BP
## t = -3.0621, df = 9.2643, p-value = 0.9935
## alternative hypothesis: true difference in means is greater than 0
## 95 percent confidence interval:
##  -12.31752       Inf
## sample estimates:
## mean of x mean of y
## -1.142857  6.571429
```

p-value from 't.test' = 0.993458

Problem 19

Part (19a)

```
n2 <- nrow(regularoil.diet)
mu2 <- mean(regularoil.diet$BP)
s2 <- sd(regularoil.diet$BP)
df2 <- n2-1
```

Average=: -1.1428571 Standard Devaiation: 3.1847853 Degree of Freedom: 6

Part (19b)

```
se2 <- s2/sqrt(n2)
```

Standard error of the average: 1.2037357

Part (19c)

```
qt975_2 <- qt(c(.975), df=df2)
CI_l2 <- mu2 - qt975_2*se2
CI_h2 <- mu2 + qt975_2*se2
```

CI: [-4.0882922,1.802578]

Part 19(d)

```
T2 <- mu2/se2
p2 <- pt(T2, df=df2)
```

p-value: 0.1895308

t-statistics: -0.9494253