# MATH-650 Assignment 5

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## Problem 20

```
data <- read.csv('case0501.csv')
labels <- unique(data$Diet)
sp <- 0
N <- 0
out <- (paste("Group", "n", "SD", "\n", sep="\t\t"))
for (x in labels){
  d <- data[data$Diet == x, ]$Lifetime
  n <- length(d)
  s <- sd(d)
  sp <- (n-1)*s*s+sp
  out <- (paste(out , "\n", x,n,s,sep="\t\t"))
  N <- N+n-1
}
cat(out)
```

```
## Group        n       SD
##
##      NP      49      6.1337009557824
##      N/N85       57      5.12529722837593
##      lopro       56      6.99169451619507
##      N/R50       71      7.76819471270947
##      R/R50       56      6.68315191212346
##      N/R40       60      6.70340582968942
```

```
sp <- sqrt(sp/N)
```

Pooled variance: $s_p = 6.6782392$ and $df = 343$

```
estimator <- function(a,b){
  x <- data[data$Diet == a,]$Lifetime
y <- data[data$Diet == b,]$Lifetime
n1 <- length(x)
n2 <- length(y)
se <- sp*sqrt(1/n1+1/n2)
estimate <- mean(x)-mean(y)
CI <- c(estimate-1.96*se, estimate+1.96*se)
tstat <- estimate/se
out <- (paste('Confidence Interval Low', CI[1], sep="\t"))
out <- (paste(out , '\n', 'Confidence Interval High', CI[2], sep="\t"))
out <- paste(out, '\n', 'Estimate', estimate, sep='\t')
out <- paste(out, '\n', 'SE', se,sep='\t')
out <- paste(out, '\n', 't-stat',tstat, sep='\t')
cat(out)
}
```

### N/R50 vs N/N85

```
#N/R50 vs N/N85
estimator('N/R50', 'N/N85')
```

```
## Confidence Interval Low  7.27809735963633
##  Confidence Interval High    11.9338126971959
##  Estimate    9.60595502841611
##  SE  1.18768248407132
##  t-stat  8.08798240038647
```

### R/R50 vs N/R50

```
#R/R50 vs N/R50
estimator('R/R50', 'N/R50')
```

```
## Confidence Interval Low  -1.75082694441255
##  Confidence Interval High    2.92788931865801
##  Estimate    0.588531187122733
##  SE  1.19355006710984
##  t-stat  0.493093003251931
```

### N/R40 vs N/R50

```
#N/R40 vs N/R50
estimator('N/R40', 'N/R50')
```

```
## Confidence Interval Low  0.524133718935906
##  Confidence Interval High    5.11483341721432
##  Estimate    2.81948356807511
##  SE  1.17109686180572
##  t-stat  2.40755795701454
```

### N/R50 lopro vs N/R50

```
#N/R50 lopro vs N/R50
estimator('lopro', 'N/R50')
```

```
## Confidence Interval Low  -4.95082694441255
##  Confidence Interval High    -0.27211068134199
##  Estimate    -2.61146881287727
##  SE  1.19355006710984
##  t-stat  -2.18798430400235
```

### N/N85 vs NP

```
##N/N85 vs NP
estimator('N/N85', 'NP')
```

```
## Confidence Interval Low  2.73921470559591
##  Confidence Interval High    7.83915980210191
##  Estimate    5.28918725384891
##  SE  1.3010064021699
##  t-stat  4.0654582829318
```