

HW1-Q2

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2023/1/25

```
library(combinat)
```

```
##  
## Attaching package: 'combinat'  
## The following object is masked from 'package:utils':  
##  
##      combn
```

Q2.i

```
y1<-c(18.5,20.3,18.5,14.1,49.2,31.2,25.1)  
y2<-c(16.4,13.3,23.3,15.6,14.2,16,10.9,9.3,12.7)  
population <- c(y1,y2)  
sample<- c(rep(1,times=length(y1)),rep(2, times=length(y2)) )  
observed<- mean(y1) - mean(y2)  
n<- length(population)  
n1<- length(y1)  
N <- choose(n, n1)  
TS <- numeric(N)  
index <- combn(1:n,n1)  
for (i in 1:N)  
{  
  TS[i] <- mean(population[index[,i]]) - mean(population[-index[,i]])  
}  
tbar <- mean(TS)  
pval <- sum(abs(TS - tbar) >= abs(observed - tbar))/N  
pval  
  
## [1] 0.00708042
```

Q2.ii

```
N <- 6000  
TS <- numeric(N)  
set.seed(407)  
for (i in 1:N) {  
  index <- sample(length(population),size = length(y1),replace = FALSE)  
  TS[i] <- mean(population[index]) - mean(population[-index])  
}  
observed <- mean(y1) - mean(y2)  
tbar <- mean(TS)
```

```
phatval <- (sum( abs(TS -tbar) >= abs(observed - tbar))+1)/(N+1)
phatval
```

```
## [1] 0.006498917
```