STAT416 Assignment 4

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Question 2:

a).

```
p.values <- read.table("https://raw.githubusercontent.com/ashishjain1988/STAT416/master/HW4/hwk4_q2.txt")
p.value <- p.values[, 1]
padjusta <- p.adjust(p.value, method = "bonferroni")
padjustTa <- rep(FALSE, length(padjusta))
padjustTa[padjusta <= 0.05] <- TRUE
deg <- length(padjustTa[padjustTa == TRUE])
```

The number of differential expressed genes by using Bonferroni method are 4.

b).

```
padjust <- p.adjust(p.value, method = "holm")
padjustT <- rep(FALSE, length(padjust))
padjustT[padjust <= 0.05] <- TRUE
deg <- length(padjustT[padjustT == TRUE])
```

The number of differential expressed genes by using Holm's method are 4.

c).

```
# c.
padjust <- p.adjust(p.value, method = "BH")
padjustT <- rep(FALSE, length(padjust))
padjustT[padjust <= 0.05] <- TRUE
deg <- length(padjustT[padjustT == TRUE])
```

The number of differential expressed genes by using Benjamini and Hochberg's method are 177.

d).

```
# source('http://bioconductor.org/biocLite.R')
# biocLite('qvalue')
library(qvalue)
qobj <- qvalue(p.value, fdr.level = 0.05)
pi0Number <- qobj$pi0
STres <- qobj$qvalues
padjustTd <- rep(FALSE, length(STres))
padjustTd[STres <= 0.05] <- TRUE
deg <- length(padjustTd[padjustTd == TRUE])
```

The number of differential expressed genes by using Storey and Tibshirani's method are 191. The π_0 value is 0.8765903.

e).

```r
getTable <- function(padjust) {
    first200 <- padjust[1:200]
    TP <- length(first200[first200 == TRUE])
    FN <- 200 - TP
    other800 <- padjust[201:1000]
    FP <- length(other800[other800 == TRUE])
    TN <- 800 - FP
    return(c(TN, FN, FP, TP))
}
parta <- getTable(padjustTa)
table <- data.frame(Properties = c("True Null", "False Null"),
    `Accept Null` = c(parta[1], parta[2]), `Reject Null` = c(parta[3],
        parta[4]))
knitr::kable(table, caption = "Table for Part a")
```

Table 1: Table for Part a

Properties	Accept.Null	Reject.Null
True Null	799	1
False Null	197	3

```r
parta <- getTable(padjustTd)
table <- data.frame(Properties = c("True Null", "False Null"),
    `Accept Null` = c(parta[1], parta[2]), `Reject Null` = c(parta[3],
        parta[4]))
knitr::kable(table, caption = "Table for Part d")
```

Table 2: Table for Part d

Properties	Accept.Null	Reject.Null
True Null	783	17
False Null	26	174