

Freshmen seminar assignment2

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2023-03-26

1. lapply vs. for loop

```
data(mtcars)

X <- mtcars[1:5]
```

lapply

```
start_time <- Sys.time()

normtest <- function(x) {

  s <- shapiro.test(x); p <- s$p.value

  return(round(p, 4))

}

apply(X, 2, normtest)
```

```
##      mpg      cyl    disp      hp   drat
## 0.1229 0.0000 0.0208 0.0488 0.1101
```

```
end_time <- Sys.time()
elapsed_time <- as.numeric(difftime(time1 = end_time,
                                     time2 = start_time,
                                     units = "secs"))

cat("elapsed time : ",sprintf("%.3f",elapsed_time),"sec",sep="")
```

```
## elapsed time : 0.016sec
```

for loop

```
start_time <- Sys.time()

result <- rep(NA, 5)
names(result) <- names(X)
```

```

for (i in 1:5) {

  x <- X[,i]

  s <- shapiro.test(x)

  result[i] <- round(s$p.value, 4)

}

result

```

```

##      mpg      cyl    disp      hp   drat
## 0.1229 0.0000 0.0208 0.0488 0.1101

```

```

end_time <- Sys.time()
elapsed_time <- as.numeric(difftime(time1 = end_time,
                                     time2 = start_time,
                                     units = "secs"))

cat("elapsed time : ",sprintf("%.3f",elapsed_time),"sec",sep="")

```

```

## elapsed time : 0.011sec

```

2. sapply vs. for loop

```

y <- mtcars[,1]
M <- max(y); m <- min(y)

```

sapply

```

start_time <- Sys.time()

normalize <- function(x) {

  return((x-m)/(M-m))

}

sapply(y, normalize)

```

```

## [1] 0.4510638 0.4510638 0.5276596 0.4680851 0.3531915 0.3276596 0.1659574
## [8] 0.5957447 0.5276596 0.3744681 0.3148936 0.2553191 0.2936170 0.2042553
## [15] 0.0000000 0.0000000 0.1829787 0.9361702 0.8510638 1.0000000 0.4723404
## [22] 0.2170213 0.2042553 0.1234043 0.3744681 0.7191489 0.6638298 0.8510638
## [29] 0.2297872 0.3957447 0.1957447 0.4680851

```

```

end_time <- Sys.time()
elapsed_time <- as.numeric(difftime(time1 = end_time,
                                   time2 = start_time,
                                   units = "secs"))

cat("elapsed time : ",sprintf("%.3f",elapsed_time),"sec",sep="")

```

```
## elapsed time : 0.004sec
```

for loop

```

start_time <- Sys.time()

ynew <- rep(NA, length(y))

for (i in 1:length(y)) {

  ynew[i] <- (y[i]-m)/(M-m)

}

ynew

```

```

## [1] 0.4510638 0.4510638 0.5276596 0.4680851 0.3531915 0.3276596 0.1659574
## [8] 0.5957447 0.5276596 0.3744681 0.3148936 0.2553191 0.2936170 0.2042553
## [15] 0.0000000 0.0000000 0.1829787 0.9361702 0.8510638 1.0000000 0.4723404
## [22] 0.2170213 0.2042553 0.1234043 0.3744681 0.7191489 0.6638298 0.8510638
## [29] 0.2297872 0.3957447 0.1957447 0.4680851

```

```

end_time <- Sys.time()
elapsed_time <- as.numeric(difftime(time1 = end_time,
                                   time2 = start_time,
                                   units = "secs"))

cat("elapsed time : ",sprintf("%.3f",elapsed_time),"sec",sep="")

```

```
## elapsed time : 0.005sec
```