Stat 142 MP Light 3

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Section: WFU

Measuring and Optimizing Program Performance

```r
data("iris")  # Load iris data

# Original function
get_means_iris <- function(specie, type){
  length_1 <- c()
  length_2 <- c()
  width_1 <- c()
  width_2 <- c()
  average_length <- c()
  average_width <- c()

  new_data <- iris[iris$Species == specie,]
  for (i in 1:nrow(new_data)){
    length_1 <- c(length_1, new_data[i, "Sepal.Length"])
    length_2 <- c(length_2, new_data[i, "Petal.Length"])
    width_1 <- c(width_1, new_data[i, "Sepal.Width"])
    width_2 <- c(width_2, new_data[i, "Petal.Width"])
  }

  average_final <- c()
  if (type == "length"){
    for (i in 1:nrow(new_data)){
      average_final <- c(average_final, (length_1[i] + length_2[i])/2)
    }
  } else {
    for (i in 1:nrow(new_data)) {
      average_final <- c(average_final, (width_1[i] + width_2[i])/2)
    }
  }

  return(average_final)
}

data("iris")  # Load iris data
```

```r
# New function
get_means_faster <-  function(specie, type){

  # Description
  # Computes the average of sepal and petal lengths (if type = "length") or widths
  # (if type = "width")

  # Parameters
  # specie -- species of iris; must be one of "setosa", "versicolor", or "virginica"
  # type -- measurement type; must be either "length" or "width"

  # Value
  # Returns a numeric vector where the i^th element is the average of the i^th sepal and
  # petal measurement (length or width, depending on 'type' argument)

  new_data <- iris[iris$Species == specie,]

  if (type == "length"){
      length_1 <- new_data$Sepal.Length
      length_2 <- new_data$Petal.Length
      average <- (length_1 + length_2)/2
  } else {
      width_1 <- new_data$Sepal.Width
      width_2 <- new_data$Petal.Width
      average <- (width_1 + width_2)/2
    }

  return(average)
}
```

```r
# Benchmarking

test_bench <- bench::mark(get_means_iris("versicolor", "length"),
                          get_means_faster("versicolor", "length"),
                          iterations = 1000,
                          time_unit = "ms")
test_bench
```

```
## # A tibble: 2 x 6
##   expression                         min median `itr/sec` mem_alloc `gc/sec`
##   <bch:expr>                       <dbl>  <dbl>     <dbl> <bch:byt>    <dbl>
## 1 "get_means_iris(\"versicolor\", \"~ 1.77   1.85      531.  328.48KB     21.0
## 2 "get_means_faster(\"versicolor\", ~ 0.0625 0.0711    12623.   9.15KB     12.6
```

```r
test_bench[1,"median"]/test_bench[2,"median"]
```

```
##    median
## 1 25.95995
```

```r
knitr::include_graphics("Benchmark.png")
```

A tibble: **2 × 13**

expression <S3: bench_expr>	min <dbl>	median <dbl>	itr/sec <dbl>	mem_alloc <S3: bench_bytes>	gc/sec <dbl>	▸
<S3: bench_e…	1.88868202	2.0427689	448.3467	107.98KB	23.59719	
<S3: bench_e…	0.06445497	0.0726349	13298.9941	9.15KB	13.31231	

2 rows | 1–6 of 13 columns

```
##########################################################
### RELATIVE PERFORMANCE: 28.1238
##########################################################
```