

# Assignment 9 - CT5102

## *Creating Closures: Functions with Data*

The aim of this assignment is to create a closure that can be used as a simple timer. The state of the closure is as follows:

- `start_time` (the start time for the timer)
- `finish_time` (the finish time for the timer)
- `duration` (the actual time)
- `all_times` (a four column tibble that stores each result) with:
  - `Name=character()`,
  - `StartTime=character()`,
  - `FinishTime=character()`,
  - `Duration=numeric()`

The functions that manipulate the data include:

- **`start(name)`** which starts the timer for the person *name*. Use the R function **`Sys.time()`**
- **`finish()`** which completes the timer. The **`archive()`** function also needs to be called to archive the result
- **`get_time()`** returns the duration of the timing
- **`summary()`** provides a summary of the data for the
- **`archive()`** stores the result in a tibble structure
- **`get_all_times()`** which returns all the stored results

Here is an example of how the program should run.

First, call the function to create the closure.

```
t <- my_timer()
str(t)

## List of 6
##  $ start      :function (name = "Unknown")
##    ..- attr(*, "srcref")= 'srcref' int [1:8] 14 16 17 15 16 15 14 17
##    .. ..- attr(*, "srcfile")=Classes 'srcfilecopy', 'srcfile' <environment: 0x7f87ebe97ec8>
##  $ finish      :function ()
##    ..- attr(*, "srcref")= 'srcref' int [1:8] 18 15 22 15 15 15 18 22
##    .. ..- attr(*, "srcfile")=Classes 'srcfilecopy', 'srcfile' <environment: 0x7f87ebe97ec8>
##  $ get_time     :function ()
##    ..- attr(*, "srcref")= 'srcref' int [1:8] 23 17 25 17 17 17 23 25
##    .. ..- attr(*, "srcfile")=Classes 'srcfilecopy', 'srcfile' <environment: 0x7f87ebe97ec8>
##  $ summary      :function ()
##    ..- attr(*, "srcref")= 'srcref' int [1:8] 26 16 30 8 16 8 26 30
##    .. ..- attr(*, "srcfile")=Classes 'srcfilecopy', 'srcfile' <environment: 0x7f87ebe97ec8>
##  $ archive      :function ()
##    ..- attr(*, "srcref")= 'srcref' int [1:8] 31 16 37 16 16 16 31 37
##    .. ..- attr(*, "srcfile")=Classes 'srcfilecopy', 'srcfile' <environment: 0x7f87ebe97ec8>
##  $ get_all_times: function ()
##    ..- attr(*, "srcref")= 'srcref' int [1:8] 38 22 40 8 22 8 38 40
##    .. ..- attr(*, "srcfile")=Classes 'srcfilecopy', 'srcfile' <environment: 0x7f87ebe97ec8>
```

Call **start()** and **finish()** for the first timing event (using a sleep function to model the passage of time)

```
t$start("Person1")
Sys.sleep(3)
t$finish()
```

Confirm the results by calling the following functions:

```
t$get_time()
```

```
## Time difference of 3.005605 secs
```

```
(t$summary())
```

```
## $Name
## [1] "Person1"
##
## $StartTime
## [1] "2019-10-24 21:09:03 IST"
##
## $FinishTime
## [1] "2019-10-24 21:09:06 IST"
```

Call **start()** and **finish()** for the second timing event (using a sleep function to model the passage of time)

```
t$start("Person2")
Sys.sleep(2)
t$finish()
```

Confirm the results by calling the following functions:

```
t$get_time()
```

```
## Time difference of 2.006881 secs
```

```
(t$summary())
```

```
## $Name
## [1] "Person2"
##
## $StartTime
## [1] "2019-10-24 21:09:06 IST"
##
## $FinishTime
## [1] "2019-10-24 21:09:08 IST"
```

Finally, show the full set of results from both timing events.

```
(t$get_all_times())
```

```
## # A tibble: 2 x 4
##   Name      StartTime      FinishTime      Duration
##   <chr>    <chr>          <chr>          <dbl>
## 1 Person1 2019-10-24 21:09:03 2019-10-24 21:09:06      3.01
## 2 Person2 2019-10-24 21:09:06 2019-10-24 21:09:08      2.01
```