

# Writing Functions in R



Introduction to R

**User-Defined Function (UDF)** - a function written by a user that goes beyond the set of functions that come built-in to R



```
## Code to summarize  
samples
```

```
< ALL THE MANY LINES  
OF NECESSARY  
CODE TO DO THAT >
```

```
## Code to do other  
stuff
```

```
< MORE CODE >
```

```
## then do something  
else
```

```
< MORE CODE >
```

summarize.R

```
## New Project
```

```
## summarize the  
samples  
< ALL THE MANY LINES  
OF NECESSARY  
CODE TO DO THAT >
```

```
## some more code
```

```
< DIFFERENT CODE >
```

```
## even more steps
```

```
< MORE DIFFERENT CODE  
>
```

new\_project.R

```
## New Project
```

```
## summarize the  
samples  
< ALL THE MANY LINES  
OF NECESSARY  
CODE TO DO THAT >
```

```
## get other stuff  
done
```

```
< THIS PROJECT'S CODE  
>
```

```
## do the next thing
```

another\_new\_project.R



If you copy and paste the same chunk of code  
more than once, **WRITE A FUNCTION INSTEAD!**



# Why write functions?

---

1. More readable code
2. Update once
3. Avoid errors

# Functions in R

---

1. name
2. argument(s)
3. body

```
name <- function(arguments) {  
  body  
}
```

## Good function names are:

---

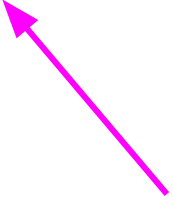
- Short
- Clear
- Descriptive
- Verbs (action words)
- In snake\_case
- Not already existing R functions

## Arguments : Inputs to function

---

```
x <- c(1, 3, 7, 19)
```

```
length(x)
```



The argument(s) go between the parentheses after the function name.

# Body

---

```
name <- function (arguments) {
```

```
CODE
```

```
CODE
```

```
CODE
```

```
CODE
```

Lines of code between the curly braces make up the body of your function

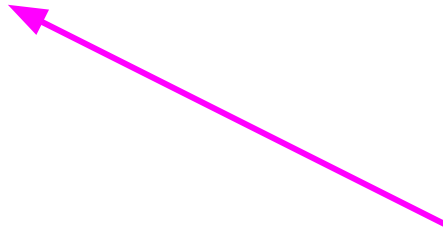
```
}
```



# Comments help make code easier to understand

---

```
name <- function(arguments) {  
  CODE  
  CODE  
  # comment explaining code  
  CODE  
  CODE  
}
```



Comments help readers  
understand what your code is  
doing

# Sections broken up by comment lines with dashes help

---

```
name <- function(arguments){  
  # Read in sample -----  
  
  <YOUR CODE HERE>  
  
  # Calculate sample information -----  
  
  <YOUR CODE HERE>  
  
  # Generate summary table -----  
  
  <YOUR CODE HERE>  
}
```

# What functions return:

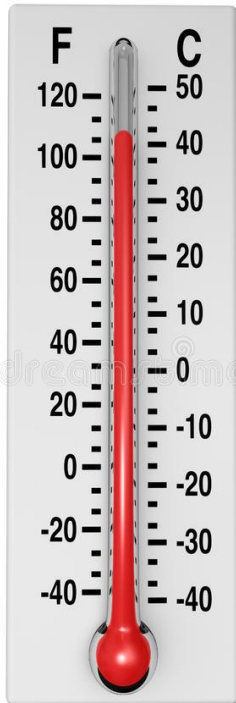
---

## ❏ Default:

- ❏ last statement evaluated
- ❏ Often: last value calculated in the function

## ❏ Can state explicitly:

- ❏ use `return` function
- ❏ ie: `return(object_you_want_to_return)`



$$F = \frac{9}{5} C + 32$$



```
## the function
celsius_to_fahrenheit <- function(C) {
  C * (9/5) + 32
}

## to run the code
> celsius_to_fahrenheit(70)
[1] 158
> celsius_to_fahrenheit(c(0, 20, 100))
[1] 32 68 212
```



```
## the (slightly more complicated) function
celsius_to_fahrenheit <- function(C) {
  F <- C * (9/5) + 32

  return(paste("The entered Celsius
temperature is", F, "degrees
Fahrenheit."))
}
```

Use return to customize  
what the function returns



```
> celsius_to_fahrenheit(70)
[1] "The entered Celsius temperature
is 158 degrees Fahrenheit."
```



```
convert_temp <- function(temp, unit) {  
  if (unit=="C") {  
    D <- temp * (9/5) + 32  
  } else if (unit=="F") {  
    D <- (temp - 32) * (5/9)  
  } else {  
    D <- message("Please enter a correct  
unit -- either F or C")  
  }  
  return(D)  
}
```





```
> convert_temp(70, "C")
```

```
[1] 158
```

```
> convert_temp(158, "F")
```

```
[1] 70
```

```
> convert_temp(158, "degrees")
```

```
Please enter a correct unit -- either F or C  
NULL
```



```
convert_temp <- function(temp, unit = "C"){  
  if (unit=="C") {  
    D <- temp * (9/5) + 32  
  } else if (unit=="F") {  
    D <- (temp - 32) * (5/9)  
  } else {  
    D <- message("Please enter a correct  
unit -- either F or C")  
  }  
  return(D)  
}
```



```
> convert_temp(70)
```

```
[1] 158
```

```
> convert_temp(70, unit = "C")
```

```
[1] 158
```

```
> convert_temp(158, unit = "F")
```

```
[1] 70
```

```
> convert_temp(158, "degrees")
```

```
Please enter a correct unit -- either F or C  
NULL
```



```
convert_temp <- function(temp, unit = "C") {  
  if (unit=="C") {  
    # if temp in C, convert to F  
    D <- temp * (9/5) + 32  
  } else if (unit=="F") {  
    # if temp in F, convert to C  
    D <- (temp - 32) * (5/9)  
  } else {  
    D <- message("Please enter a correct  
unit -- either F or C")  
  }  
  return(D)  
}
```

Comments  
help readers  
quickly  
understand  
the code



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goes beyond the set of functions  
that come built-in to R

