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User-Defined Functions

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Topic Number	Topic Name
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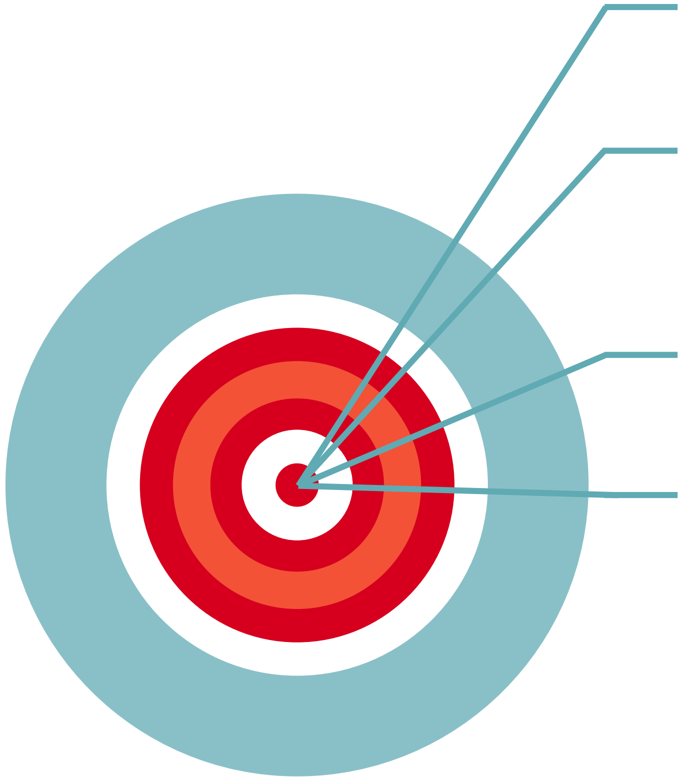
Learning Objectives

By the end of this unit, you will be able to:



- Explain the idea of user defined functions
- Develop and demonstrate different kinds of user-defined functions
- Apply functions on data structures
- Illustrate three-dots construct in R with an example demonstrating functions with multiple arguments

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Functions

Functions

Function can be defined as a set of statements organised together to perform a specific task facilitating code reuse. They are also known as user-defined functions.

```
Pseudocode: function_name <- function(arg_1, arg_2, ...)
                    { Function body }
```

Example: This below function takes a value "y" and checks if it is greater than 1

```
isGTOne <- function(y)
{         if (y > 1)
          return("y is greater than 1")
               else
          return("y is less than 1")          }
```

Detailed Explanation of Functions

Below is an example of a function taking arguments. The value which the argument “a” in the function is received from the point where the function is called.

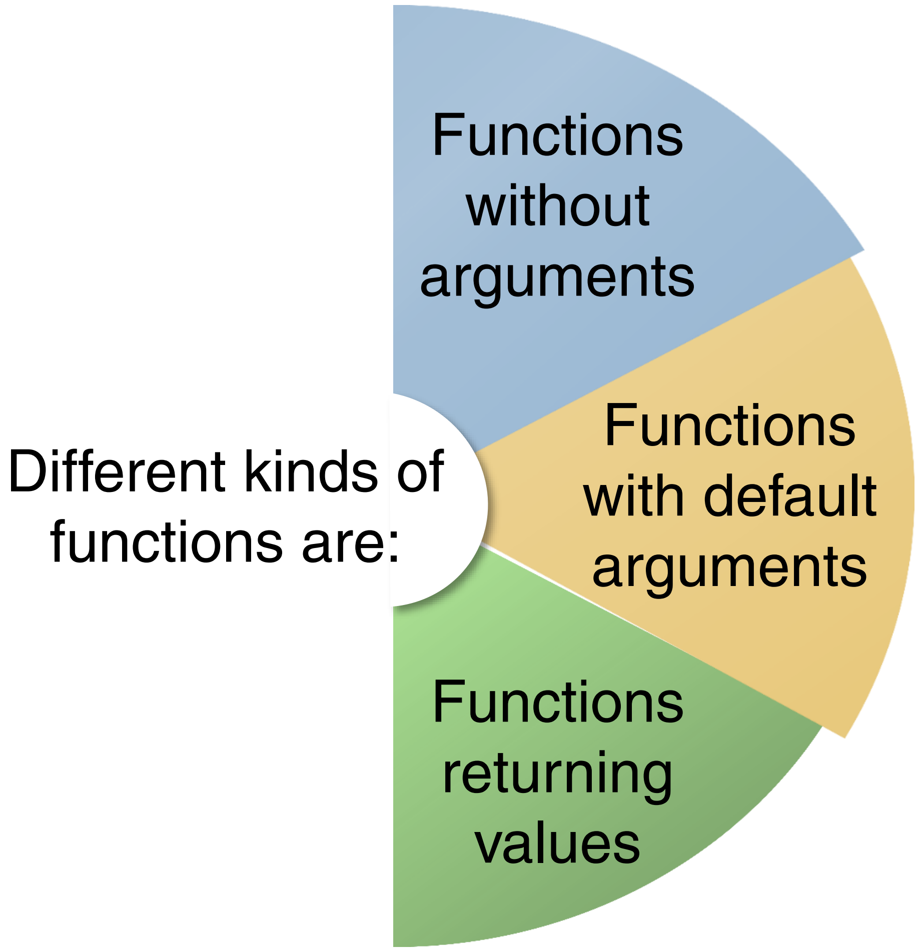
Example:

```
        myfunc = function(a) { # A function to print hello 5 times
        i = 1
        while( i <= a)
        {       print(“Hello”)
                i=i+1                   }
```

Call the function myfunc:

myfunc(5) # Calling a function, 5 is the value that gets passed to “a”.

Different Kinds of Functions


Different kinds of functions are:
Functions without arguments
Functions with default arguments
Functions returning values

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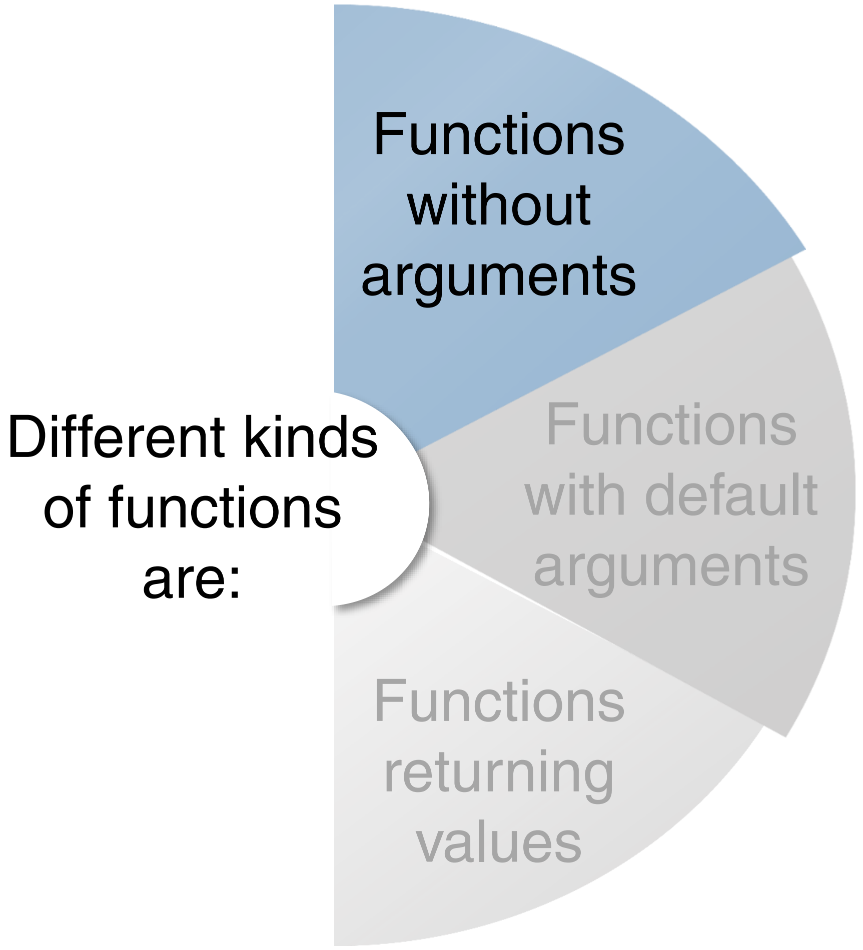
Functions Without Arguments


Different kinds of functions are:
Functions without arguments
Functions with default arguments
Functions returning values

Example:

```
greetings = function() {
print("Hello..good morning")
}
```

Calling the function:

```
greetings()
```

Output:

```
Hello..good morning
```

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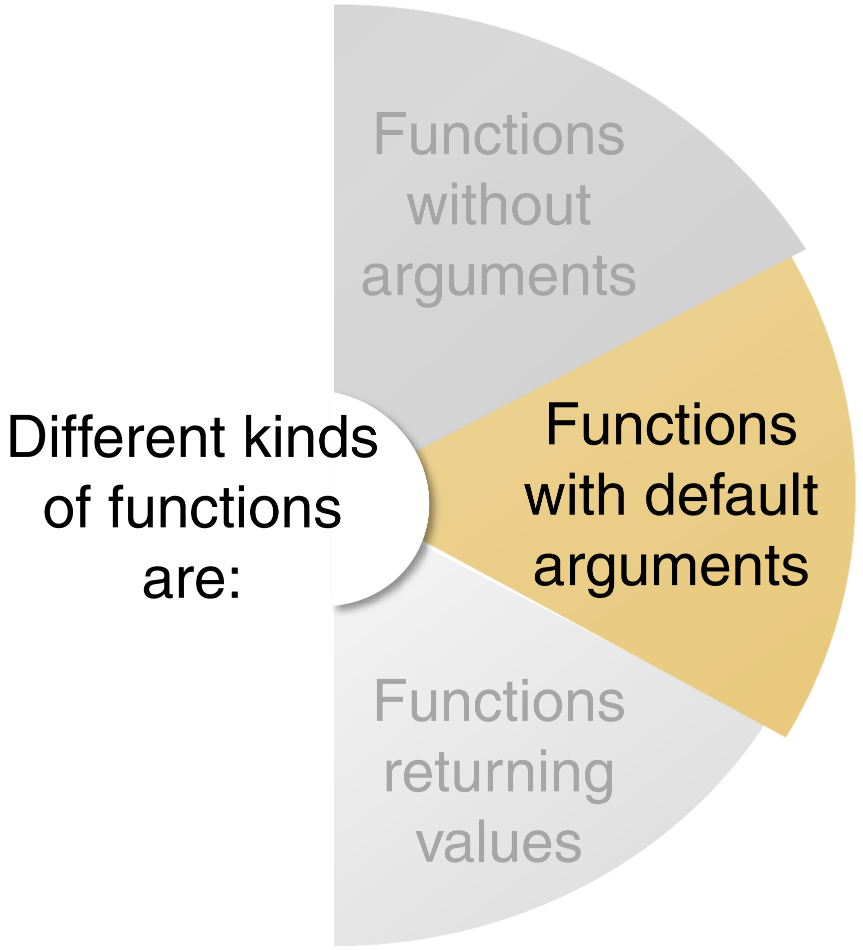
Functions With Default Arguments


Different kinds of functions are:
Functions without arguments
Functions with default arguments
Functions returning values

Example:

```
myfunc = function(a=6,b=4)
{           s=a+b
            print(s)  }
```

Calling the function:

```
myfunc()
```

Output:

```
10
```

Note: The function was called without passing any values to the arguments. However, the result was computed based on the default arguments present during function definition.

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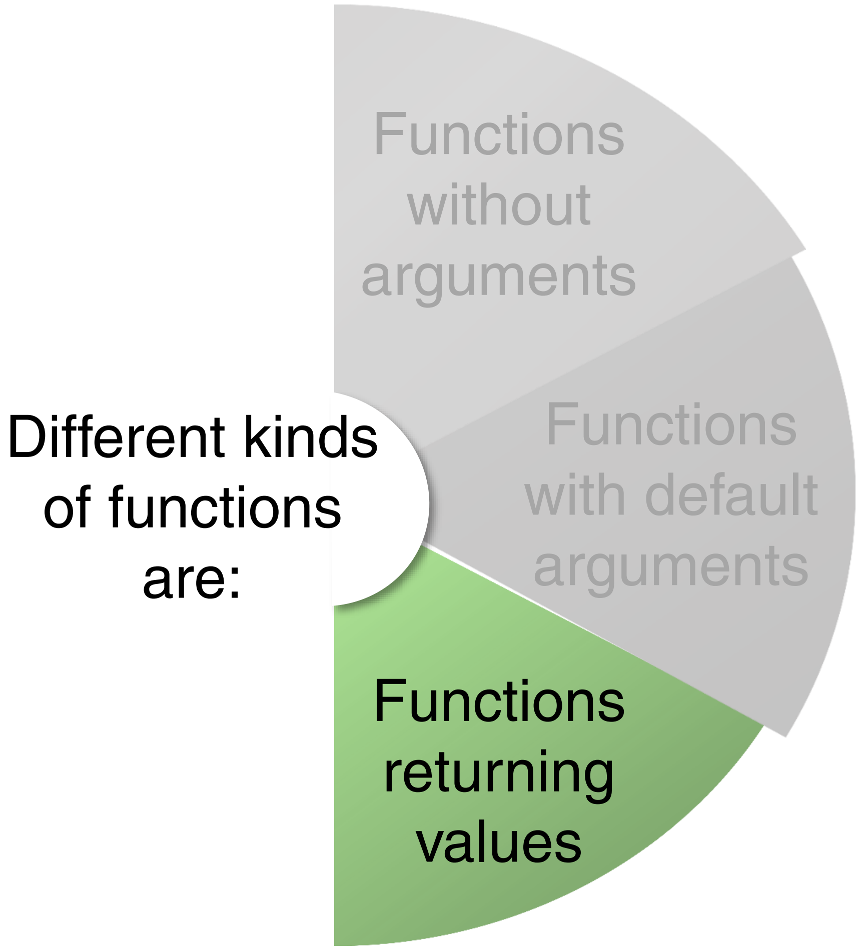
Functions Returning Values


Different kinds of functions are:
Functions without arguments
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Functions returning values

Example:

```
mysum = function(a,b)
{         s = a+b
          return(s)       }
```

Calling the function:

```
print(mysum(10,20))
```

Note: The functions mysum is called by passing the values 10 and 20.

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Functions and Data Structures

Using functions for manipulating data structures

Passing a data frame as an argument to a function:

Example:
Create a simple data frame called “mydata” and pass it to the function my.func

```
a = 1:5
b = 6:10
c = 11:15
mydata=data.frame(a,b,c)
my.func <-function(mydata)
{         row15andcol3 = mydata[c(1,5),3]
          return(row15andcol3)           }
print(my.func(mydata)) # function call
```

The third element of row 1 and row 5 would be returned.

Functions with Variable Number of Arguments

The Three-dots Construct in R

The three dots construct is a mechanism which allows a function to accept variable number of arguments.

Example:

```
print(x, ...)
```

This means that, the function can take any number of named or unnamed arguments.

The Three-dots Construct in R

Example:

```
Greetings <- function(...)
        {
                arguments <- list(...)
                print(arguments)
        }

Greetings("Good", "Morning", "!")
```

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Summary

Summary

In this unit, you learnt:

- Function can be defined as a set of statements organised together to perform a specific task facilitating code reuse. They are also known as user-defined functions.
- Different kinds of functions are:
  - Functions without arguments
  - Functions with default arguments
  - Functions returning values
- The three dots construct is a mechanism which allows a function to accept variable number of arguments.

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THANK YOU!