Functions in R

Spoken Tutorial Project
https://spoken-tutorial.org
National Mission on Education through ICT

http://sakshat.ac.in/

Script: Varshit Dubey

Narration: Sudhakar Kumar

IIT Bombay

12 September 2019

We will learn:

We will learn:

- ▶ **Need for functions**

We will learn:

- ▶ **Need for functions**
- ▶ **How to create a user-defined function**

Learning Objectives

We will learn:

- ▸ **Need for functions**
- ▸ **How to create a user-defined function**
- ▸ **Scope of variables**

Pre-requisites

► **Basics of permutation and combination**

- **Basics of permutation and combination**
- **Basic data structures**

- **Basics of permutation and combination**
- **Basic data structures**
- **Conditional statements**

Pre-requisites

- **Basics of permutation and combination**
- **Basic data structures**
- **Conditional statements**

Please locate the relevant tutorials on https://spoken-tutorial.org/

System Specifications

System Specifications

- **Ubuntu Linux OS v 16.04**

System Specifications

- **Ubuntu Linux OS v 16.04**
- **R v 3.4.4**

System Specifications

- **Ubuntu Linux OS v 16.04**
- **R v 3.4.4**
- **RStudio v 1.1.463**

System Specifications

- **Ubuntu Linux OS v 16.04**
- **R v 3.4.4**
- **RStudio v 1.1.463**

R version 3.2.0 or higher

Download Files

We will use:

We will use:

- **A script file myFunctions.R**

Download Files

We will use:

- **A script file myFunctions.R**

Download this file from the **Code files** link of this tutorial

Functions

Functions

- **A function is a set of statements organized together to perform a specific task**

Functions

- **A function is a set of statements organized together to perform a specific task**

- **R has a large number of built-in functions**

Functions

- **A function is a set of statements organized together to perform a specific task**

- **R has a large number of built-in functions**

- **In spite of that, sometimes we need to define our own functions**

User-defined Functions

User-defined Functions

- **User-defined functions are specific to user's requirements**

User-defined Functions

- **User-defined functions are specific to user's requirements**
- **Once created, these functions can be used as the built-in functions**

- **An R function is created by using the keyword** **function**

User-defined Functions

- **An R function is created by using the keyword** **function**
- **The syntax of an R function is as follows:**

User-defined Functions

- **An R function is created by using the keyword** **function**

- **The syntax of an R function is as follows:**

```
myFun <- function(arguments){
    Body
}
```

User-defined Functions

The different parts of a function are:

The different parts of a function are:

- ▶ **Name**

The different parts of a function are:

- ▶ **Name**
- ▶ **Arguments**

User-defined Functions

The different parts of a function are:

- ▶ **Name**
- ▶ **Arguments**
- ▶ **Body**

User-defined Functions

The different parts of a function are:

- ▶ **Name**
- ▶ **Arguments**
- ▶ **Body**
- ▶ **Return value**

Example of a Function

We want to create a function
sum_between_two **such that**

We want to create a function *sum_between_two* **such that**

- ▶ **It takes two natural numbers** *num*1 **and** *num*2 **as its arguments**

We want to create a function
sum_between_two **such that**

- ▶ **It takes two natural numbers** *num*1
  and *num*2 **as its arguments**
- ▶ **Then, it returns the sum of all
  numbers from** *num*1 **to** *num*2

For example, if we pass 2 and 6 to the function *sum_between_two*,

For example, if we pass 2 and 6 to the function *sum_between_two*, **it should return the value of** $2 + 3 + 4 + 5 + 6$

Scope of Objects and Variables

Scope of Objects and Variables

▶ **Scope is the term used to describe how objects and variables get defined within R**

Scope of Objects and Variables

- **Scope is the term used to describe how objects and variables get defined within R**

- **If a variable is defined inside a function, then it can be accessed inside the function only**

▶ **So, if we try to access the same variable outside the function, it will throw an error**

Summary

We have learnt:

- ► **Need for functions**
- ► **How to create a user-defined function**
- ► **Scope of variables**

1. **Create a function which computes the combination of two numbers**

Assignment

2. **Create a function which**

2. **Create a function which**
   - ▶ **takes a natural number as an argument, and prints Fibonacci series**

2. **Create a function which**
   - ▸ **takes a natural number as an argument, and prints Fibonacci series**
   - ▸ **For example, consider** **fibonacci(5)** **It should print the first 5 elements of Fibonacci series, i.e. 1, 1, 2, 3, 5**

About the Spoken Tutorial Project

- ▶ Watch the video available at http://spoken-tutorial.org /What_is_a_Spoken_Tutorial

- ▶ It summarises the Spoken Tutorial project

- ▶ If you do not have good bandwidth, you can download and watch it

Spoken Tutorial Workshops

The Spoken Tutorial Project Team

- ▶ **Conducts workshops using spoken tutorials**

- ▶ **Gives certificates to those who pass an online test**

- ▶ **For more details, please write to contact@spoken-tutorial.org**

Forum to answer questions

- Do you have questions in THIS Spoken Tutorial?
- Choose the minute and second where you have the question
- Explain your question briefly
- Someone from the FOSSEE team will answer them. Please visit

http://forums.spoken-tutorial.org/

Forum to answer questions

- ► **Questions not related to the Spoken Tutorial?**

- ► **Do you have general / technical questions on the Software?**

- ► **Please visit the FOSSEE Forum**
  http://forums.fossee.in/

- ► **Choose the Software and post your question**

Textbook Companion Project

- **The FOSSEE team coordinates coding of solved examples of popular books**

- **We give honorarium and certificates to those who do this**

For more details, please visit these sites:

https://r.fossee.in/
https://fossee.in/

Acknowledgements

- **Spoken Tutorial Project is a part of the Talk to a Teacher project**
- **It is supported by the National Mission on Education through ICT, MHRD, Government of India**
- **More information on this Mission is available at:**
  http://spoken-tutorial. org/NMEICT-Intro

Thank You

- The script for this tutorial was contributed by Varshit Dubey (CoE Pune)

- The video has been created by Sudhakar Kumar, IIT Bombay