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Academy of Data Science

Control Structures

PRESENTED BY

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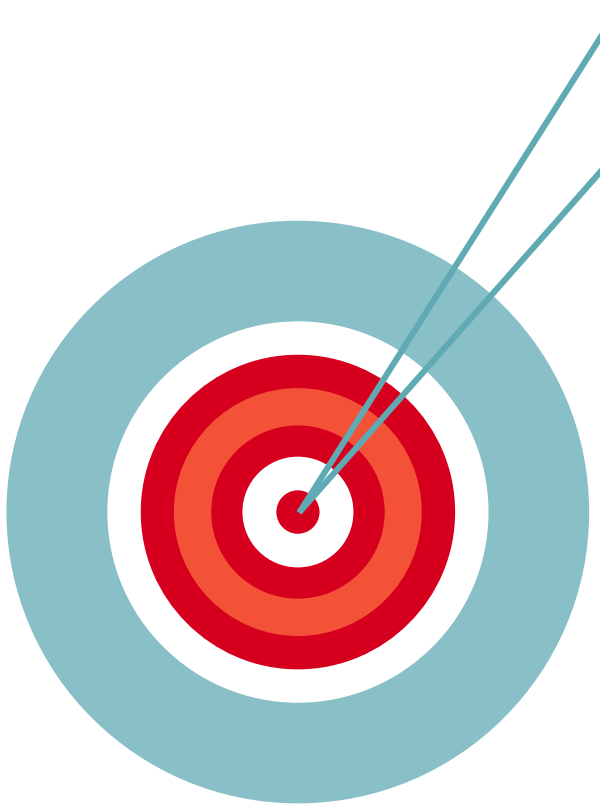
Learning Objectives

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



- Explain different control structures
- Apply control structures in R programming

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Introduction to Control Structures

What are Control Structures?

Control structures allow you to control the flow of execution of a program. A few common control structures are:

- if, else
- for
- while
- repeat
- break
- next
- return

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Different Control Structures

If –Else condition

On the condition holding TRUE, the code block following the 'if' statement gets executed; on the failure of the condition, the 'else' block gets executed.

Pseudocode:

```
if (condition) {
    # do something
} else {
    # do something else}
```

Example:

```
x <- 5
if(x > 0){
  print("Non-negative number")
} else {
  print("Negative number")}
```

Loops (for loops)

A ‘for’ loop works on an iterable variable picking up values, typically from a vector and assigns successive values till the end of the collection is reached.

Example:

```
for (i in 1:3) {  #  i in 1:3 can also be in the form of (i in c(1,2,3))
    print(i)
}
```

Output:

```
1
2
3
```

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While Loop

The 'while' loops are used to loop until a specific condition is met.

The test expression is evaluated and the body of the loop is entered, only if the result is TRUE.

The statements inside the loop are executed and the flow returns to evaluate the test expression again.

This is repeated until the test expression evaluates to FALSE, in which case, the loop exits.

While Loop

When the statements inside the loop are executed, the flow returns to evaluate the test expression again.

Pseudocode:

```
while (test_expression)
{
   statement
}
```

Example:

```
i=0
while(i<10)
 {print(i)
  i=i+1}
```

Repeat and Break

'Repeat and break' executes a sequence of statements multiple times and abbreviates the code that manages the loop variable.

Pseudocode:

```
repeat {
   commands
   if(condition) {
      break
   }
}
```

Example:

```
i=0
repeat {
  print(i)
  if(i==10) {break}  # Break statement is used to exit the loop
  i=i+1 }
```

Next

A 'next' statement is used to skip the current iteration of a loop without terminating it.
On encountering 'next', the R parser skips further evaluation and starts next iteration of the loop.

Example:

```
x <- 1:5
for (val in x) {
    if (val == 3){
        next
    }
    print(val)}
```

Return

Return statement is used to explicitly return a desired value from a function.

Pseudocode:

return(expression)

Example:

```
mysum = function(a,b)
{
s = a+b
return(s)
}
print(mysum(10,20))
```

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Summary

Summary

In this unit, you learnt:

- Control structures allow to control the flow of execution of a program.
- The different control structures are:
  - if, else
  - for
  - while
  - repeat
  - break
  - next
  - return

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