

CT5102: Programing for Data Analytics

Assignment 10: Implementing a FIFO-queue package

Implement an S3 class (qfifo) as a package. The package should offer the following functions to manipulate a first-in first-out queue structure. Submit the R package project as a zip file. It should be ready to be opened and tested as an R Project.

Function	Purpose	Document	Export
qfifo()	A constructor to create a class "qfifo"	Yes	Yes
add(q,v)	A generic function to add values to a queue	Yes	Yes
add.qfifo(q,v)	S3 method to add a value to qfifo	No	Yes
top(q)	A generic function to get the top value from the queue	Yes	Yes
top.qfifo(q)	S3 method to add to get the top value	No	Yes
process(q)	A generic function to remove the top value from the queue	Yes	Yes
process.qfifo(q)	S3 method to remove the top value	No	Yes

The functions should be automatically documented using Roxygen tags, and contain examples of how they can be run inside the console. For example.

`qfifo {qfifo}`

[R Documentation](#)

The constructor for fifoq

Description

The constructor for fifoq

Usage

```
qfifo()
```

Value

An S3 object of class fifoq

Examples

```
q <- fifoq()
```

Add a value to the queue

Description

Add a value to the queue

Usage

```
add(q, val)
```

Arguments

`q` is the current fifo queue object

`val` is the value to be added to the queue

Value

The updated queue object

Examples

```
q <- qfifo()  
q <- add(q, 1234)
```

Return the top value in the queue

Description

Return the top value in the queue

Usage

```
top(q)
```

Arguments

`q` is the current fifo queue object

Value

The top of the queue

Examples

```
q <- qfifo() q <- add(q,1234) v <- top(q)
```

[process {qfifo}](#)

[R Documentation](#)

Delete the top element from teh queue

Description

Delete the top element from teh queue

Usage

```
process(q)
```

Arguments

`q` is the current fifo queue object

Value

The modified queue

Examples

```
q <- qfifo()  
q <- add(q,1234)  
q <- add(q,5678)  
q <- process(q)
```

The package should pass the following automated tests.

```
library(testthat)
library(qfifo)

context("qfifo tests...")

test_that("Constructor created ok ...", {
  q <- qfifo()
  expect_true(class(q) == "qfifo")
})

test_that("Add a value to the queue ...", {
  q <- qfifo()
  q <- add(q, "456")
  expect_true(q$data[[1]] == "456")
})

test_that("Check that top () works...", {
  q <- qfifo()
  q <- add(q, "456")
  expect_true(top(q) == "456")
})

test_that("Check that process() works...", {
  q <- qfifo()
  q <- add(q, "456")
  q <- add(q, "789")
  q <- process(q)
  expect_true(top(q) == "789")
})
```