

Exercise 1

The `cumsum` function calculates the cumulative sum. It has a single argument `x`, which has to be either numeric or can be coerced to numeric (like boolean values) and returns a numeric vector of the same length as the first argument `x`. The first element of the return value is the first element of `x`. The second element is the sum of the first and second element of `x`. The third element is the sum of the first, second, and third element of `x`, etc. The cumulative sum of the first 12 natural numbers is

```
cumsum(1:12)

# [1]  1  3  6 10 15 21 28 36 45 55 66 78
```

From this, we can also extract the cumulative sums of all natural numbers < 12 . The cumulative minimum of the given series of numbers is

```
cummin(c(10, 6, 3, 5, 2, 1, 8, 7, 4, 9))

# [1] 10  6  3  3  2  1  1  1  1  1
```

Note that you have to create a vector with the values by using `c()`. You can not pass the values like the following

```
cummin(10, 6, 3, 5, 2, 1, 8, 7, 4, 9)

# Error in cummin(10, 6, 3, 5, 2, 1, 8, 7, 4, 9): 10 arguments passed to 'cummin' which
requires 1
```

In this case we passed 10 vectors of length 1 to `cumsum`, which only takes one argument.

If we are curious about what happens when we have special input, we can just test it (since R is interpreted). For instance, we could put an `NA` somewhere into the vector or sum up boolean values.

```
cummin(c(10, 6, 3, 5, 2, NA, 1, 8, 7, 4, 9))

# [1] 10  6  3  3  2 NA NA NA NA NA NA

cumsum(c(TRUE, TRUE, FALSE, FALSE, TRUE))

# [1] 1 2 2 2 3
```

Exercise 2

The histogram can be created like to following. All arguments except `las` are explained on the help page for `hist`. Since `las` is not known to `hist` and `hist` has a `...` argument, `las = 1` goes into `...`. Everything that goes here will be passed to another function that sets the global parameters for graphical output. `las = 1` for instance makes all tick labels horizontal.

```
x <- rnorm(1000)

hist(
  x = x,          # The first x is the argument name, the second x our vector.
  freq = FALSE,   # This plots the density instead of the frequencies/counts.
  xlab = "Standard normally distributed random numbers",
  ylab = "Density",
  main = "A Histogram of Random Numbers",
  las = 1
)
```

