testwhat

taking testing to another level

Filip Schouwenaars
filip@datacamp.com

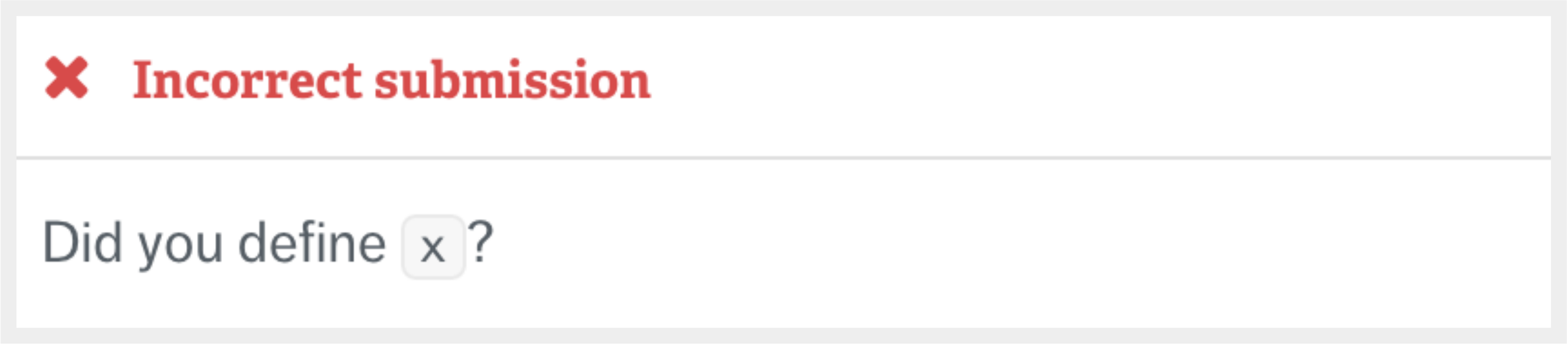
DataCamp

- Interactive Online Data Science School
- Coding challenges
- Tailored feedback

Example

- Assign 10 to the variable x

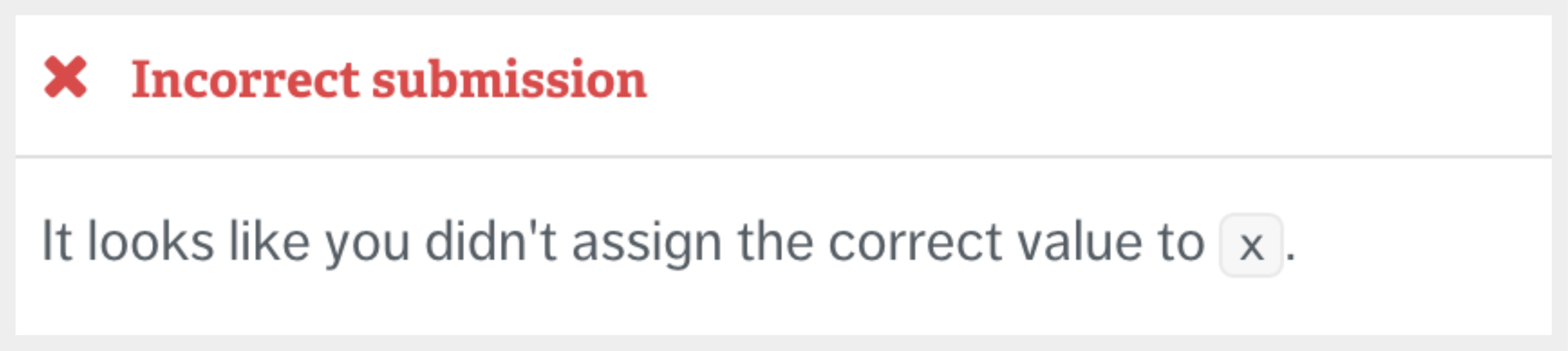
```
> a <- 7
```



✖ **Incorrect submission**

Did you define `x`?

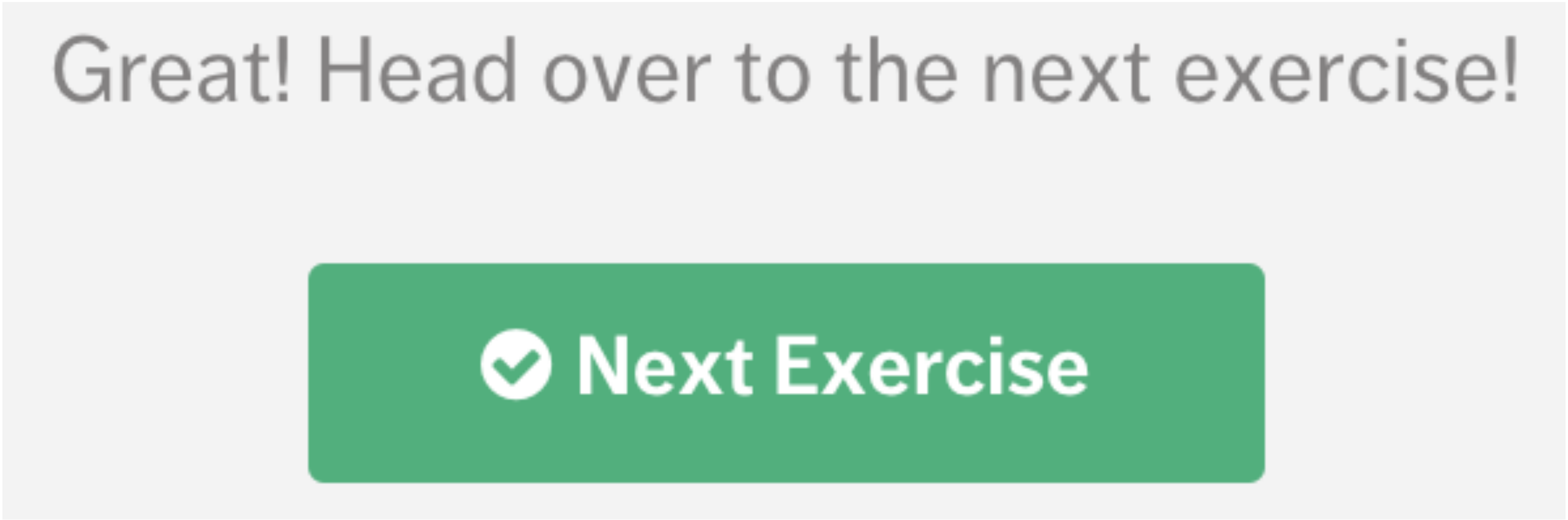
```
> x <- 8
```



✖ **Incorrect submission**

It looks like you didn't assign the correct value to `x`.

```
> x <- 10
```



Great! Head over to the next exercise!

Unit Testing in R

testthat (Hadley Wickham)

```
hypothenuse <- function(a,b) {
  return("I love useR")
}
```

```
test_that("hypothenuse works", {
  expect_that(hypothenuse(3,4), equals(5))
  expect_that(hypothenuse(2,0), equals(2))
})
```

```
> test_file("test-hypothenuse.r")

1. Failure: hypothenuse() works  ---------
hypothenuse(3, 4) not equal to 5
Mean relative difference: 0.2788897.
```

```
# Assign 10 to the variable x
x <- 8
```

```
test_that("x is defined correctly", {
  expect_that(exists("x"), is_true())
  expect_that(x, equals(10))
})
```

```
> test_file("test-exercise.r")

1. Failure: x is defined correctly -------
x not equal to 10
Mean relative difference: 0.2.
```

But what about...

- A student correctly performed a t-test?

```
> t.test(df$post, df$pre)
```

- Correctly used `.N` and by in `data.table`?

```
> DT[,.N, by=10*round(Sepal.Length*Sepal.Width/10)]
```

- Correctly created `ggvis` plot?

```
> pressure %>%
    ggvis(~temperature, ~pressure, fill := ~black) %>%
    layer_points()
```

`testwhat` (Andreas Alfons)

Unit Testing for DataCamp

- Convenient wrapper functions:
  `test_object()`
  `test_function()`
  `test_output_contains()`
  `...`
  All use `test_that()` - `expect_that()` construct
- Leverage `testthat`'s resilience

test_object()

```
# Assign 10 to the variable x
x <- 8
```

student

```
# Assign 10 to the variable x
x <- 10
```

solution

```
# SUBMISSION CORRECTNESS TEST
test_object("x")
})
```

```
> test_exercise()
List of 2
 $ : logi FALSE
 $ : chr "It looks like you didn't assign
the correct value to x."
```

test_object()

```
# Assign 10 to the variable x
x <- 10
x <- (function(){ return(10) })()
```

student

```
# Assign 10 to the variable x
x <- 10
```

solution

```
# SUBMISSION CORRECTNESS TEST
test_object("x")
```

```
> test_exercise()
List of 2
 $ : logi TRUE
 $ : chr "You’re a coding rockstar!"
```

test_function()

```
rnorm(100, sd = 3)
rnorm(100, 0, 3)
rnorm(sd = 3, n = 100)
x <- 100
rnorm(x, sd = 3)
...
```

student

```
rnorm(100, sd = 3)
```

solution

```
# SUBMISSION CORRECTNESS TEST
test_function("rnorm", args = c("n", "sd"))
```

```
> test_exercise()
List of 2
 $ : logi TRUE
 $ : chr "Nice code!"
```

test_function()

```
rnorm(90, sd = 3)
```

student

```
rnorm(100, sd = 3)
```

solution

```
# SUBMISSION CORRECTNESS TEST
test_function("rnorm", args = c("n", "sd"))
```

```
> test_exercise()
List of 2
 $ : logi TRUE
 $ : chr "It looks like you didn't set the
correct value for the argument n in the function
rnorm()."
```

DataCampReporter

```
1. Failure: x is defined correctly ----
x not equal to 10
Mean relative difference: 0.2.
```

```
List of 2
 $ : logi FALSE
 $ : chr "It looks like you didn't
assign the correct value to x."
```

Custom Feedback

```
# Assign 10 to the variable x
x <- 8
```

student

```
# Assign 10 to the variable x
x <- 10
```

solution

```
# SUBMISSION CORRECTNESS TEST
test_object("x",
            incorrect_msg = "Segmentation fault!")
```

```
> test_exercise()
List of 2
 $ : logi FALSE
 $ : chr "Segmentation fault!"
```

More information

- Feel free to contribute
  www.github.com/Data-Camp/testwhat
- One month access to DataCamp
  www.datacamp.com/useR2015
- Create courses for datacamp
  teach.datacamp.com
- We’re hiring!
  www.datacamp.com/careers

Questions?

Filip Schouwenaars
filip@datacamp.com