Assertions and testing

STAT 243 Section 3
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Assertion vs. Testing

Assertions

- Produce error message inside a function
- Document private properties and assumptions of a class.
- Work on live data
  - Allows testing of infinitely many cases

Testing

- Produce error message based on function output
- Check externally visible properties.
- Tests only a small number of cases.

Both assertions and testings are a part of good defensive coding practices.

They ensure that functions are working as expected.

Assertions

Assertions

Assertions check whether a statement is true and return an error if not.

Three primary types

1. Pre-conditions: input as expected
2. Invariants: intermediate computation as expected
3. Post-conditions: end values as expected

assertthat package

assertthat is a package that provides functions for producing useful error messages.

Three main functions

1. assert_that() signals an error if the argument passed to it is FALSE.
2. see_if() returns logical value with error message as attribute if the argument passed to it is FALSE.
3. validate_that() returns error message as a string if the argument passed to it is FALSE.

assertthat package

It is good practice to add assertions in your functions to ensure they are behaving properly.

You can also add your own error messages using the on_failure() function.

There is an example in the tutorial.

assertthat package

Demo

Unit testing

Unit testing

Unit testing describes reproducible tests that provide formal checks of function output.

This replaces the more informal version of testing where the user tests a number of examples in the command line.

There are a number of benefits including fewer bugs and better code structure.

testthat package

R package for adding unit tests to your code.

There are two primary aspects of testings that form a hierarchy:

1. Tests: Check output of function is as expected. You will likely have multiple tests per function.
2. Expectations: Tests are made up of a number of expectations about the properties of the output

testthat package

Demo