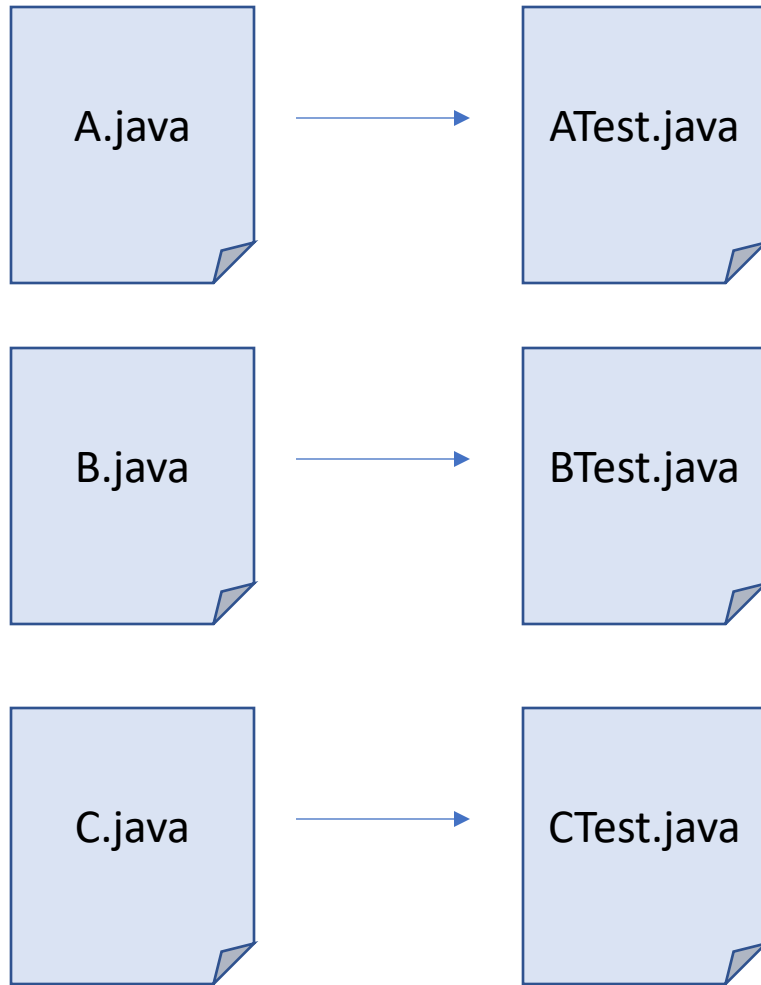


The testing pyramid

Maurício F. Aniche

M.F.Aniche@tudelft.nl



That's what we
have been calling
Unit Testing.

Some definitions

- ISQTB: *“Searches for defects in, and verifies the functioning of software items (e.g., modules, programs, objects, classes, etc) **that are separately testable**”.*
- Osherove: *“A unit test is an automated piece of code that invokes a unit of work in the system and then checks a single assumption about the behavior of that unit of work. [...] A unit of work is a single logical functional use case in the system that can be invoked by some public interface (in most cases). A unit of work **can span a single method, a whole class or multiple classes working together to achieve one single logical purpose that can be verified.**”*

Advantages

- Very fast
- Easy to control
- Easy to write

Disadvantages

- Less real
- Some bugs can't be reproduced at such level



When do we need more reality?
What can we do to gain reality?

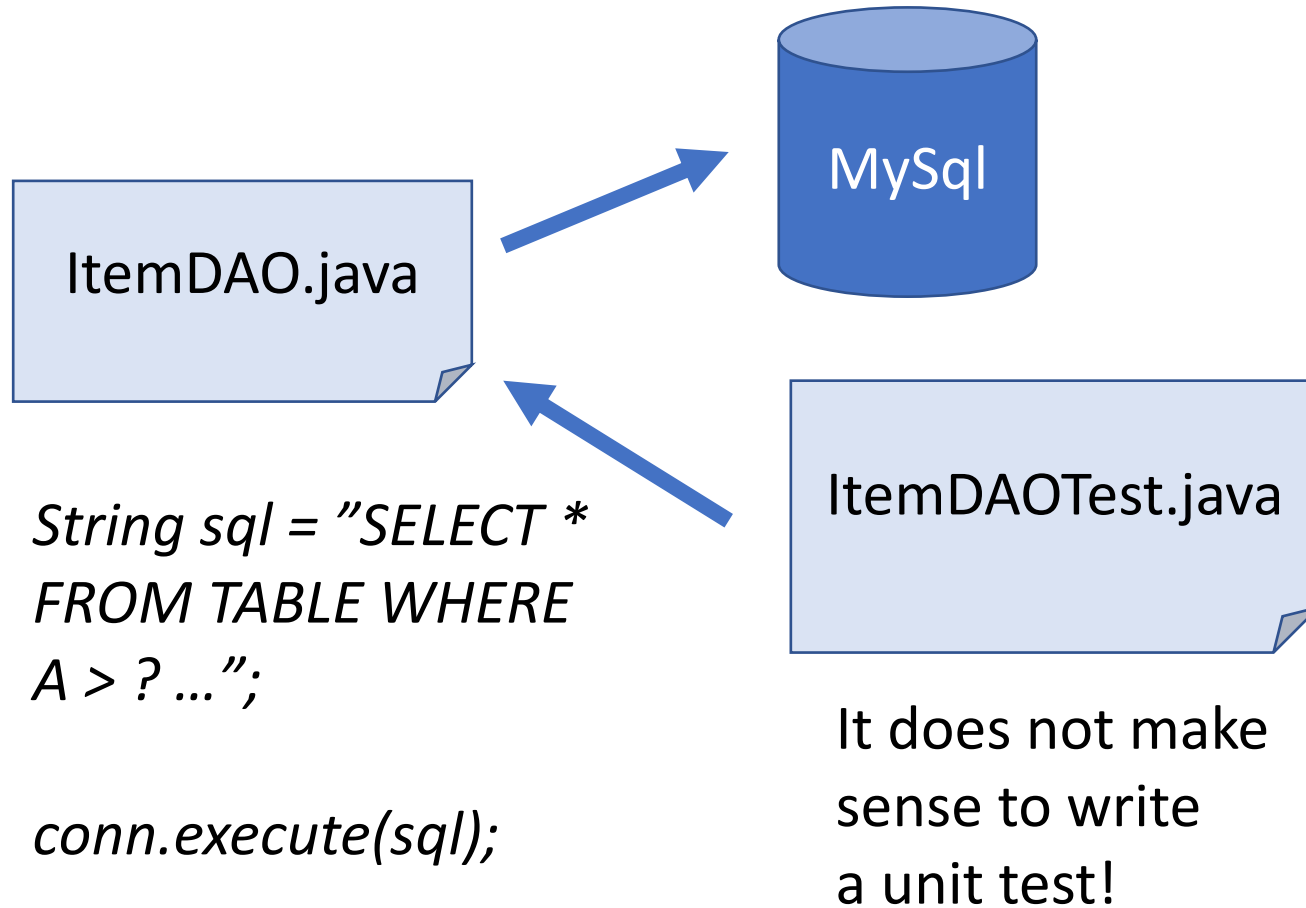


We can start testing more pieces together

- Maybe test 2 or more classes together.
- Test the integration with the database.
- Test the web application via its UI.

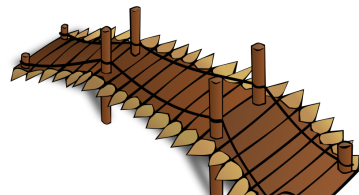
It can be very challenging!

Let's do an integration test!

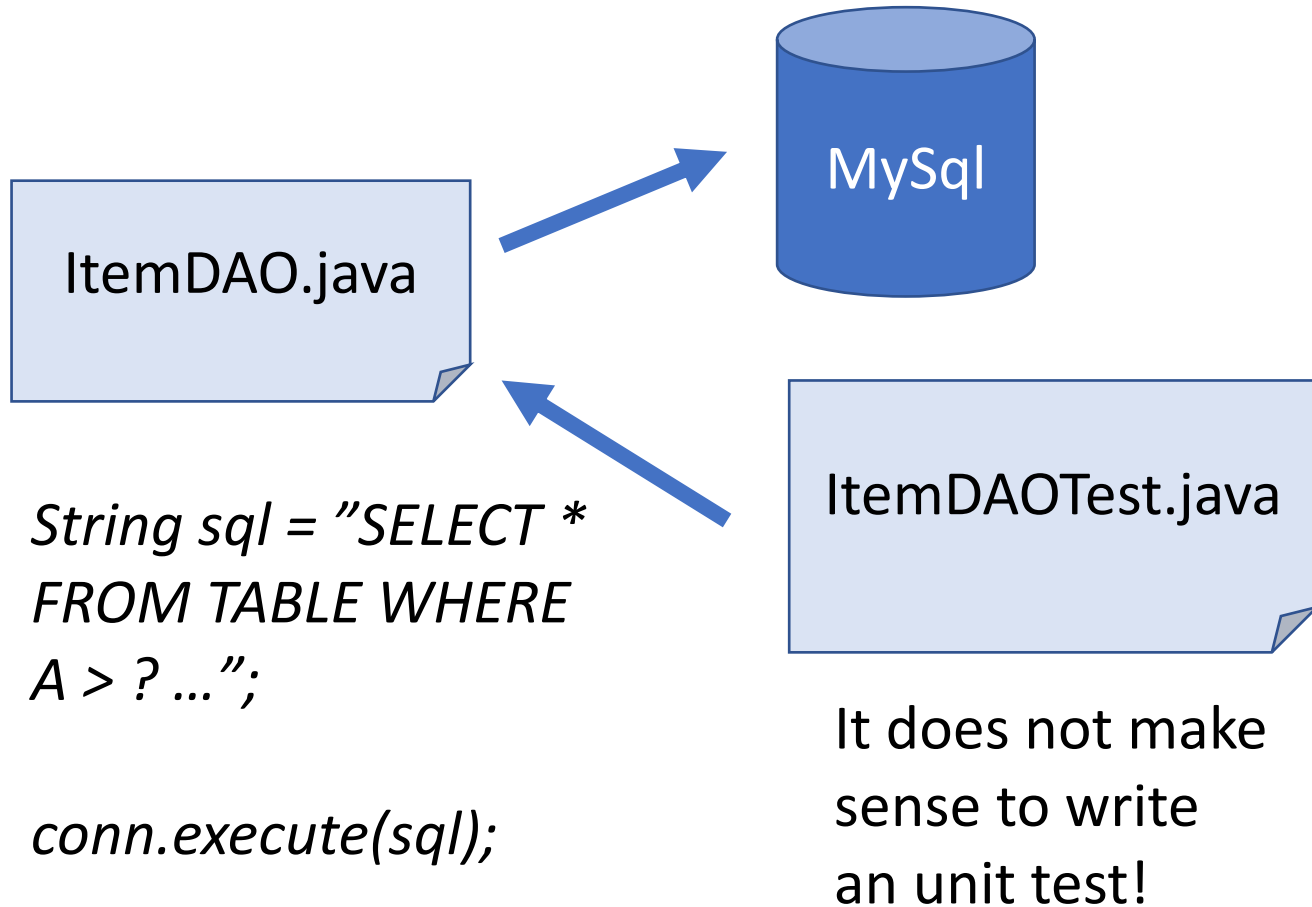


Integration means...

- Testing the interaction of one component (part of your system) to another component.
 - Your architecture defines what a component is.
- One component to an external infrastructure, such as a database or the operational system.
- *ISQTB: “Tests interfaces between components, interactions to different part of a system such as OS, file system, hardware or interfaces between systems.”*



It's more real, but harder to be done!



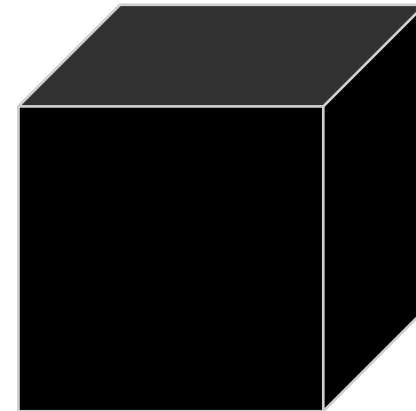
- We need a DB!
- Make sure the DB has the right schema
- Set up the database state (INSERTs, ...)
- Make sure one test does not interfere in the other
 - Clean up everything after the test

Unit, integration...

Can we get even
more real?



We can do **System Testing!**



Advantages

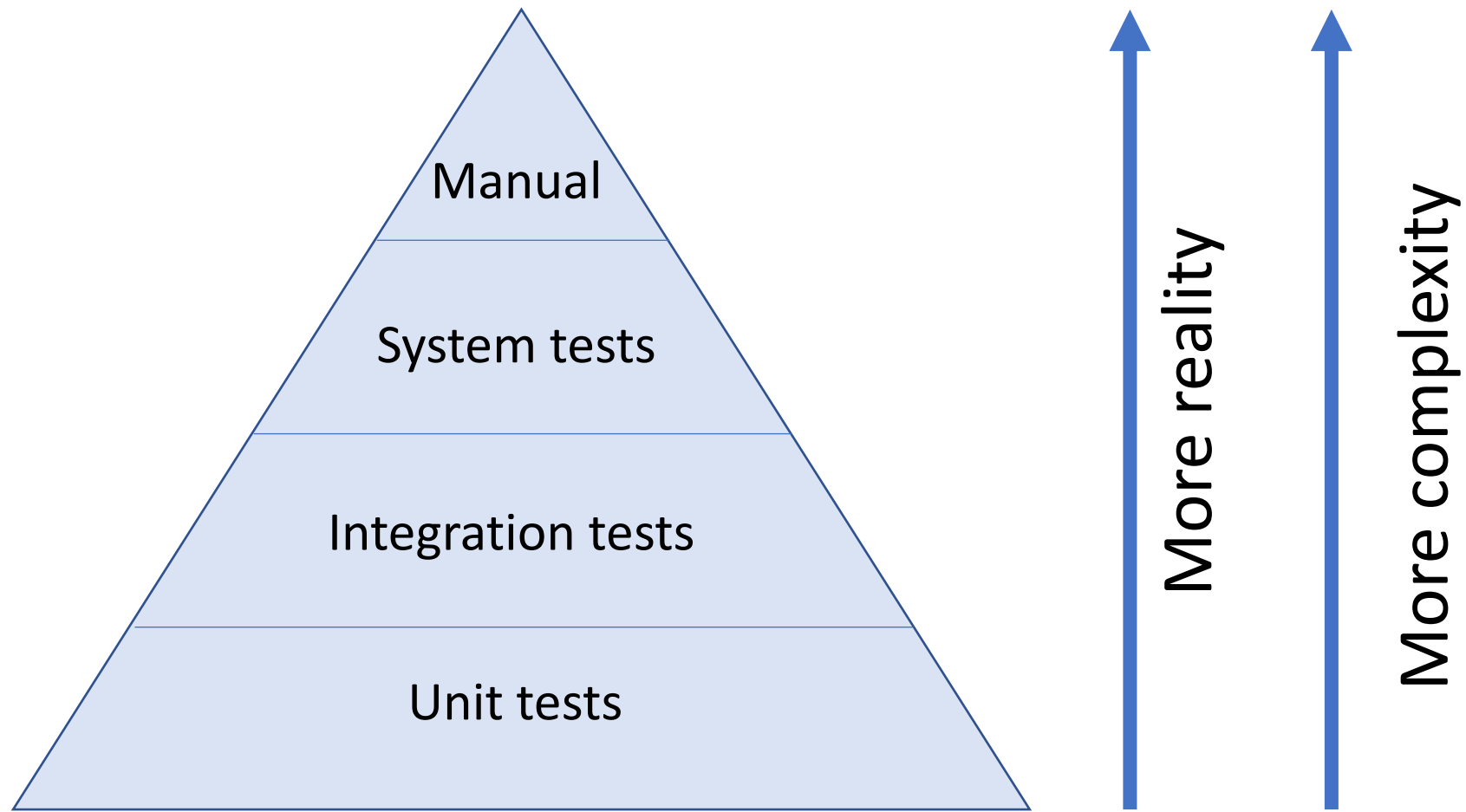
- Very realistic
- Captures the user perspective

Disadvantages

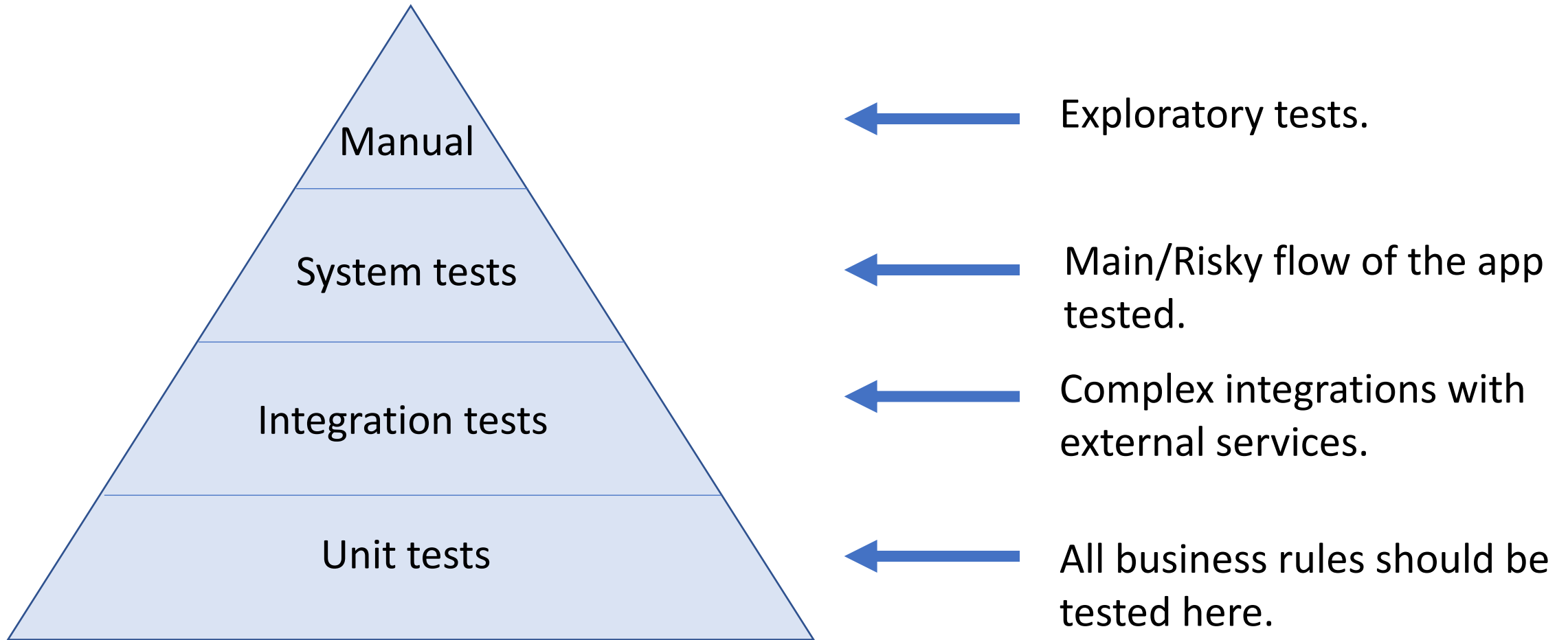
- Slow
- Hard to write
- Flaky



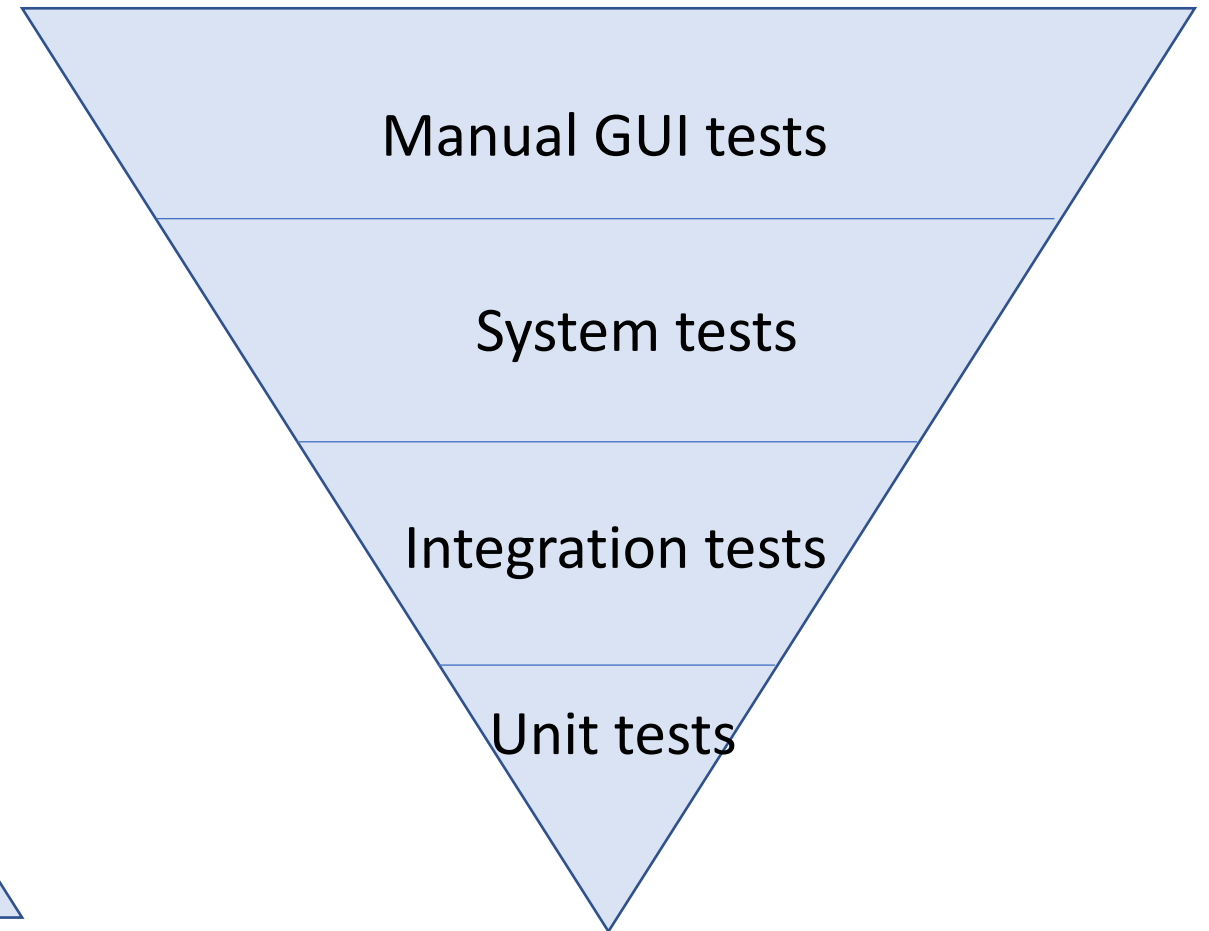
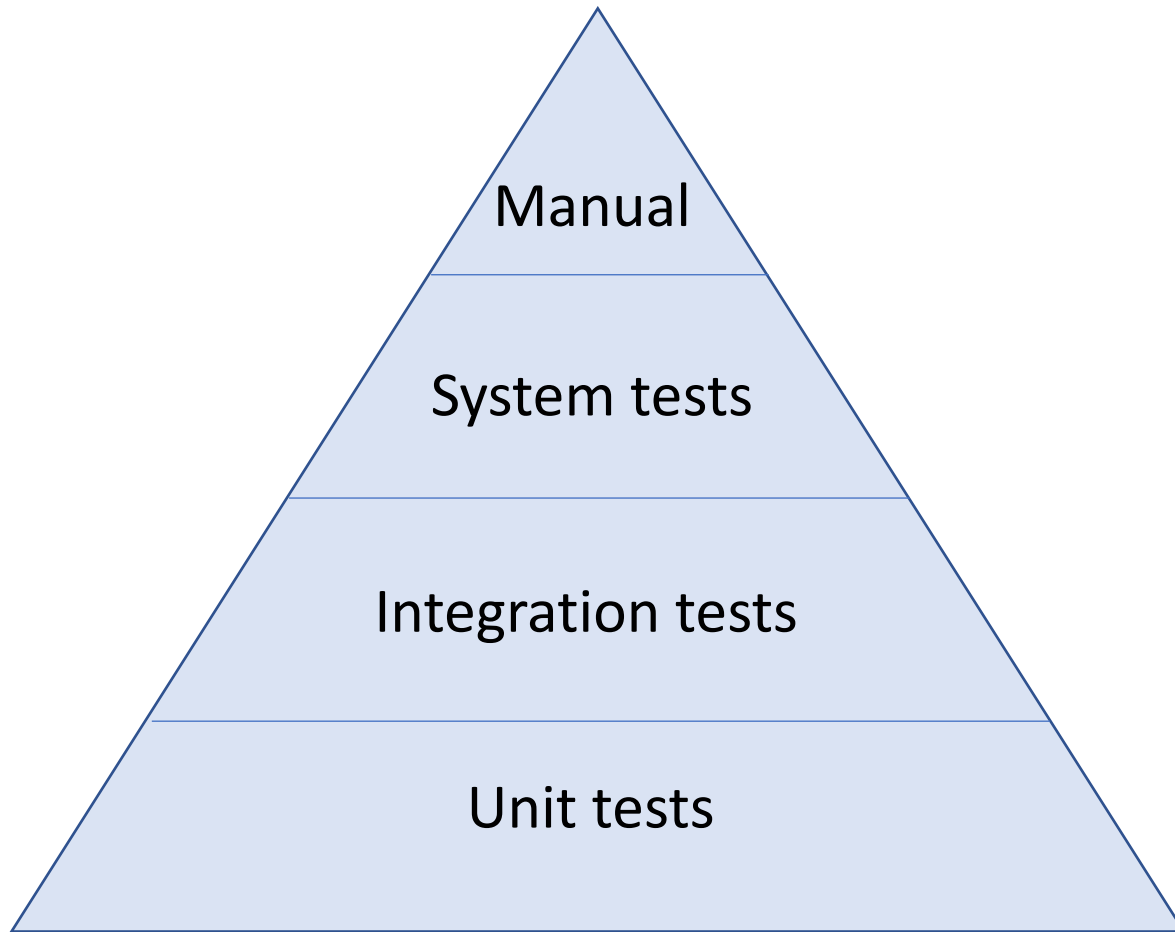
Testing pyramid



How I (Maurício) do the trade-off



The ice-cream cone anti-pattern



The Practical Test Pyramid

The "Test Pyramid" is a metaphor that tells us to group software tests into buckets of different granularity. It also gives an idea of how many tests we should have in each of these groups. Although the concept of the Test Pyramid has been around for a while, teams still struggle to put it into practice properly. This article revisits the original concept of the Test Pyramid and shows how you can put this into practice. It shows which kinds of tests you should be looking for in the different levels of the pyramid and gives practical examples on how these can be implemented.

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Ham Vocke

Ham is a software developer and consultant at ThoughtWorks in Germany. Being tired of deploying software

manually at 3 a.m., he added continuous delivery and diligent automation to his toolbox and set out to help teams deliver high-quality software reliably and efficiently. He makes up for the time gained by annoying people with his antics.

Find **similar articles** at the tag: [testing](#)

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 - Sociable and Solitary
 - Mocking and Stubbing
 - What to Test?
 - Test Structure
 - Implementing a Unit Test
- Integration Tests
 - Database Integration
 - Integration With Separate Services
- Contract Tests
 - Consumer Test (our team)
 - Provider Test (the other team)

The practical test pyramid:

<https://martinfowler.com/articles/practical-test-pyramid.html>

References

- Chapter 2 of the Foundations of software testing: ISTQB certification. Graham, Dorothy, Erik Van Veenendaal, and Isabel Evans, Cengage Learning EMEA, 2008.
- Osherove, R. (2015). *The art of unit testing*. MITP-Verlags GmbH & Co. KG.
- The practical test pyramid:
<https://martinfowler.com/articles/practical-test-pyramid.html>