Testing Show and Tell

LEAN TECHNIQUES

Unit vs Integration vs E2E
Compare Approaches
Not covering TDD (today)
Conversational

TODAY'S
AGENDA

Goal

- There is no silver bullet
- Every option has tradeoffs
- Quick feedback and Confidence

Demo App

- https://github.com/leantechniques/testing-comparison/

Unit Tests

Unit Test Characteristics

- FIRST
- **F**ast
- **I**solated
- **R**epeatable
- **S**elf-validating
- **T**imely

Unit Test Example in React and Java

Unit Tests Tradeoffs

Pros
- Rapid Feedback
- Clarifies Design
- Deterministic
- Test logic in isolation
- Find bugs quicker
- Less time in the debugger

Cons
- Isolation can give less confidence than integration tests
- Can be tightly coupled to implementation

Integration Tests

Integration Test Characteristics

- Broad category of non-unit tests
- Invokes multiple parts of a system together
- May have external dependencies
- May not all be in memory
- Usually less deterministic IF there are uncontrolled dependencies
- Also useful for testing legacy code

Integration Test Example in React and Java

Integration Tests Tradeoffs

Pros

- Can give more confidence due to testing more of the system together
- Can be less tightly coupled to implementation

Cons

- Can be less deterministic than unit tests
- Usually slower than unit tests
- Can be more maintenance than unit tests
- Shared state management

End to End Tests

E2E Test Characteristics

- Type of integration test
- Invokes a system from the entry point to its end
- Will have external dependencies
- Will not be in memory
- Usually slowest form of integration test
- Usually less deterministic IF there are uncontrolled dependencies

End to End Test Example using React and Java

E2E Tests Tradeoffs

Pros

- Can give the most confidence

- Usually much less tightly coupled to implementation

Cons

- Is less deterministic than unit tests

- Much slower than unit tests

- Are more maintenance than unit tests
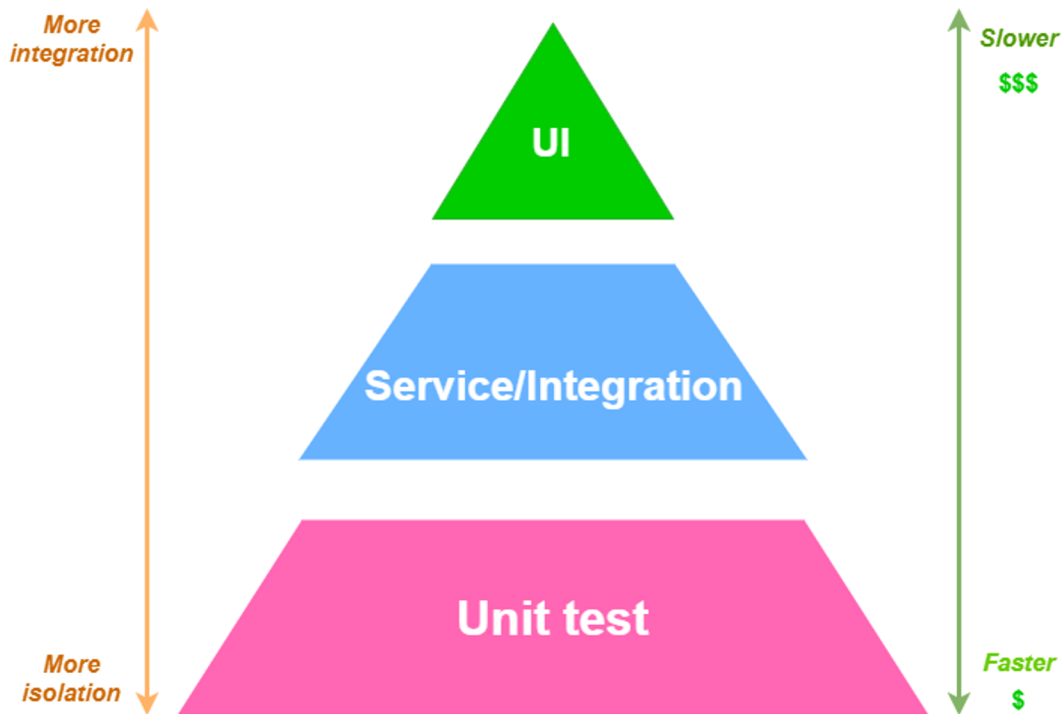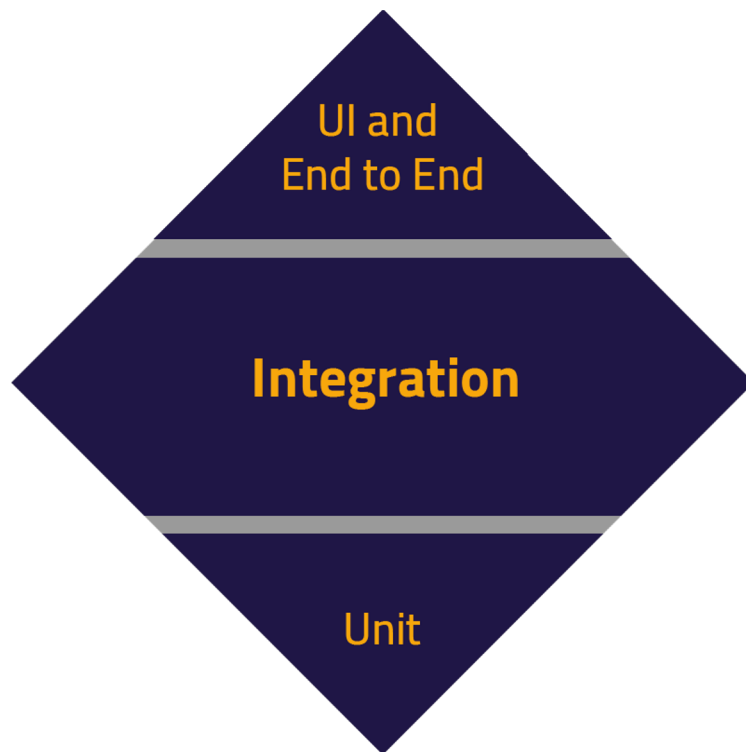
How many of each?

It Depends!

Testing Pyramid

More integration

More isolation

UI

Service/Integration

Unit test

Slower

$$$

Faster

$

Testing Diamond

Testing Trophy

End to End

A helper robot that behaves like a user to click around the app and verify that it functions correctly.

Sometimes called "functional testing" or e2e.

Integration

Verify that several units work together in harmony.

Unit

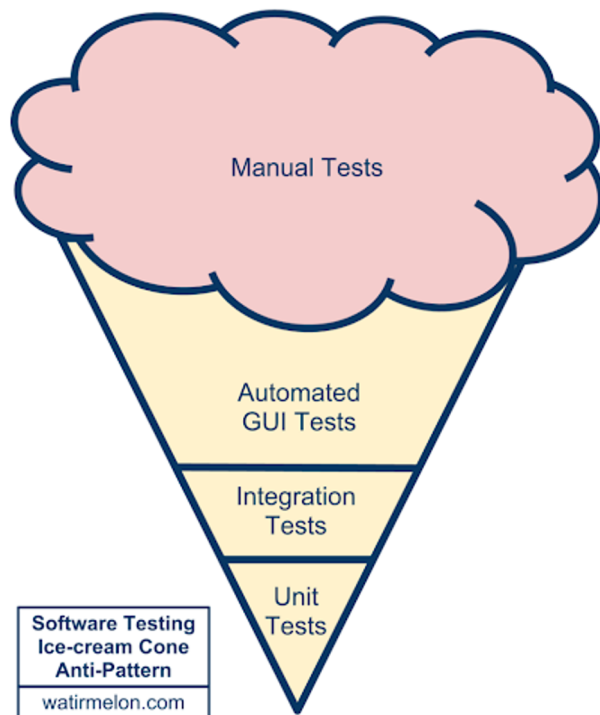Verify that individual, isolated parts work as expected.

Static

Catch typos and type errors as you write the code.

Testing Ice Cream Cone

Manual Tests

Automated GUI Tests

Integration Tests

Unit Tests

Software Testing Ice-cream Cone Anti-Pattern
watirmelon.com

Summary

- Tradeoffs with different approaches
- Remember – we want quick feedback and confidence
- Which tradeoff you accept is up to you

Discussion